

SECTION 02713

WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Installation, testing and disinfection of water lines and appurtenances.

1.02 RELATED WORK

- A. Section 02221: Trenching, Backfilling and Compaction
- B. Section 02305: Boring and Jacking
- C. Section 02605: Separation of Piped Utilities

PART 2 PRODUCTS

2.01 General

- A. All equipment and parts shall meet NSF/ANSI 61, Annex G and F for no lead content, or the newest version thereof.

2.02 DUCTILE IRON PIPE AND FITTINGS

A. Pipe:

1. Manufactured in accordance with ANSI A-21.50 (AWWA C-151) and ANSI A-21.10 (AWWA C-110).
2. A cement lining meeting the requirements of ANSI 21.4 (AWWA C-104).
3. A minimum of 1 mil. Thick bituminous coating on the outside surface.
4. Clearly mark with manufacturer's name, D.I. or Ductile, weight, class or nominal thickness, and casting period.
5. Unless otherwise specified or shown on the plans, ductile iron pipe shall be Class 50 for 200 psi working pressure.

B. Fittings:

1. Fittings 4" – 24": Pressure rated at 350 psi.
2. Fittings 30" – 36": Pressure rated at 250 psi.
3. Joints meeting the requirements of ANSI A-21.11 (AWWA C-111)

2.03 SERVICE PIPE

A. Copper Pipe:

1. Seamless copper tubing meeting the requirements of ASTM B-88, Type K.

2. Contain not less than 99.90% copper and not more than 0.04% phosphorous.
3. Suitable for use with a working water pressure of 160 psi.
4. ¾ inch nominal diameter unless otherwise specified or shown on the plans.
5. Service pipe shall be used to connect the corporation stop with the meter yoke. Use the minimum length required to make a straight-line connection including a gooseneck.

2.04 WATER SERVICE ASSEMBLIES

A. Water Meters: (Furnished and Installed by Town)

B. Water Main Connections:

1. Tap water mains in the upper half of the pipe at a 45-degree angle or provide brass-tapped couplings with AWWA threads.
2. Do not exceed the pipe manufacturers recommended maximum tap size.
3. Use service clamps on all taps for PVC pipe.

C. Corporation Stops:

1. AWWA C-800.
2. Cast of brass meeting NSF/ANSI 61, Annex G and F for no lead content, or the newest version thereof.
3. Watertight and individually tested for leaks.
4. Waterway diameter approximately equal to the nominal size of the stop.
5. Coat or cap all threads for protection prior to installation.

D. Meter Yokes:

1. Copper tubing with an integral brace and meter stop.
2. Minimum rise of 14"
3. Provide with outlets designed for the use of polyethylene or copper service pipe.

E. Service Clamps:

1. Bronze with neoprene gasket and double straps
 - a. Mfg. No. Rockwell 313
 - b. Mfg. No. J.C.M. 402
 - c. Mfg. No. Baker Series 181
 - d. Mfg. No. Dresser Style 91

F. Meter Boxes:

1. Concrete from Goddard Concrete Services or
2. Plastic from DRW Plastics, Inc. model DFW36C-12-1CA

2.05 VALVES AND VALVE BOXES

A. Gate Valves:

1. AWWA C-500
2. Of iron body, resilient seat gate, non-rising stem type.
3. Stuffing boxes: a-ring seal type with two (2) rings in the stem located above the thrust collar.
4. 2" square wrench nut for operation of the valve.
5. Minimum design working water pressure of 200 psi for valves with diameters 2"-12" and 150 psi for valves with diameters of 14"-54", unless otherwise specified or shown on the Plans.
6. Joints: ANSI A-21.11 (AWWA C-111)
7. Bonnet or body markings: Manufacturer's name, year of casting, size, pressure rating, and OPEN with direction.
8. Open by counter-clockwise operation, unless otherwise specified.

B. Main Line Pressure Reducing Valves:

1. Cast iron globe body, full bronze mounted, external pilot operated, single, resilient seated type.
2. Packed with leather (or other soft material) to insure tight closure and to prevent metal-to-metal friction and seating.
3. Open when the downstream pressure is less than the valve setting and close tightly when the downstream pressure exceeds the valve setting.
4. Valve opening: proportional to the delivery requirements and not influenced by changes in inlet pressure.
5. Pilot valve: arranged to allow for its removal from the main valve while under pressure and easily accessible without removal of springs, weights, or the use of special tools.
6. Suitable to operation at 200 psi working water pressure and adjustable.

C. Valve Boxes:

1. Cast iron, 2 or 3 pieces, screw type with shaft diameter of not less than 5".
2. Heavy roadway type equipped with a cover containing the word "WATER" in raised letters on the top.
3. Base of such size as to permit its installation without allowing it to come in contact with either the valve or the pipe.
4. Valve boxes shall be as manufactured by Tyler Pipe 6850 Series.

2.06 AIR RELEASE ASSEMBLIES

- A. Furnish in 1" nominal diameter for 8" mains and smaller and in 2" nominal diameter for 10" mains and larger, unless otherwise specified or shown on the Plans.

B. Air release assemblies shall consist of:

1. Double strap, bronze service clamp with neoprene gasket (for PVC lines)
2. Galvanized steel pipe of the nominal diameter required by the main size.
3. Red brass corporation stop
4. Galvanized steel elbow
5. Gate valve

6. Air release valve
- C. Combination air release valves consisting of:
 1. An air and vacuum valve coupled with an air release valve.
 2. Cast iron body, stainless steel float, bronze linkage, bronze trim, suitable for use in mains having a working pressure of 200 psi.
- D. Install in a pre-cast concrete manhole, 48" in diameter and 48" deep, with 24" nominal diameter cast iron frame and cover.
- E. Place crushed stone from the top of the main to 12" below the bottom of the main.

2.07 FIRE HYDRANTS

- A. Fire Hydrants: (Mueller Centurion, or M & H, or Clow)
 1. AWWA C-502
 2. Cast iron bodies, fully bronze mounted, designed for operation at a working water pressure of 150 psi.
 3. Furnish with two 2½" threaded brass hose nozzles and one threaded brass pumper nozzle.
 4. Compression type main valve 5¼" or 4½" in diameter faced with a suitable yielding material such as rubber, leather, or balata.
 5. So designed that, when it is installed, no excavation is required to remove the main valve or the movable parts of the drain valve.
 6. Inside diameter of barrel: at least 120 percent of the hydrant valve size.
 7. Inlet connection: minimum of 6" mechanical joint on all lines, unless otherwise specified or shown on the plans.
 8. Equipped with safety flange located not more than 2" above ground and a two-piece shaft breakaway assembly.
 9. Open on counter-clockwise operation, unless otherwise specified.
 10. Shop paint and mark in accordance with AWWA C-502. Public Hydrants will be Factory Painted Silver and Private Hydrants will be Factory Painted Red.
 11. Cast markings: manufacturer's name, size of the main valve, year of manufacture, and direction of opening.
 12. Field touch-up, if the surface has been marred, with paint supplied by the manufacturer of the same color and type as that used during shop painting.
 13. Fire Hydrants to be placed on 500' centers in residential areas and 400' in commercial areas.
 14. A standard fire hydrant is required at the end of all coves.
 15. Do not backfill areas requiring blocking until inspector has approved.

PART 3 EXECUTION

3.01 PREPARATION

- A. Prior to laying pipe, prepare a suitable bedding according to Section 02221.

- B. Before placing pipe in the trench, field inspect for cracks or other defects; remove defective pipe from the construction site.
- C. Swab the interior of the pipe to remove all undesirable material.
- D. Prepare the bell end and remove undesirable material from the gasket and gasket recess.
- E. All connections to existing mains shall start with an isolation valve.
- F. All wrap around tapping sleeves will be stainless steel.
- G. All tapping sleeves will be tested at time of installation.

3.02 INSTALLING WATERLINES

- A. Lay all pipes in a straight line on a uniform grade.
- B. After applying gasket lubricant, take extreme care to keep the spigot end from contacting the ground.
- C.hone the pipe with suitable tools or equipment.
- D. Closely follow the manufacturer's instruction in laying and joining pipe.
- E. Cut pipe for inserting valves, fittings, etc. in a neat and workmanlike manner without damaging the pipe so as to leave a smooth end at right angles to the axis of the pipe.
- F. Locate waterlines in relation to other piped utilities in accordance with Section 02605.

3.03 INSTALLING APPURTENANCES

- A. Securely plug open ends of pipe at the close of each workday and during temporary discontinuance of pipe laying.
- B. Set all valves, fittings, hydrants and other specials in a neat workmanlike manner.
- C. Use thrust blocks, as show on the Plans, pipe anchors or other approved means to prevent displacement of other fittings.
- D. Erect hydrants to stand plumb with the pumper nozzle facing the road.
- E. Effect drainage of hydrants by using 6 cubic feet of gravel.
- F. Close dead ends with cast iron plugs or caps and equip with blow-off assemblies, where shown on drawings.

3.04 CLEANING AND DISINFECTION OF WATER LINES

- A. Keep waterlines clean prior to disinfection.
- B. Thoroughly disinfect waterlines prior to placing in service.
 - 1. Use chlorine disinfecting agent applied to produce a satisfactory dosage.
 - 2. Allow water to escape from the ends of all lines to cause dispersion of the chlorine solution into all parts of the system.
 - 3. Operate all valves and hydrants during the time disinfection is occurring.
 - 4. Retain the chlorine solution in the lines for a period of 24 hours.
 - 5. At the end of the 24-hour period, the residual chlorine must be a minimum of 10 ppm. Otherwise, repeat the disinfection procedure again as per AWWA C-651. The Town's Inspector will conduct a test for chlorine residual.
 - 6. Thoroughly flush the lines and collect a sample for bacteriological analysis. If the same is acceptable, the lines may be connected to the system. Otherwise, repeat the disinfection procedure until acceptable samples are obtained.

3.05 WATER LINE PRESSURE TESTS

- A. Subject all newly laid pipe or any valved section thereof to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing.
- B. Test pressure shall:
 - 1. Not be less than 150 PSI.
 - 2. Not exceed the pipe or thrust restraint design pressures.
 - 3. Be of at least 2-hour duration.
 - 4. Not vary by more than ± 5 PSI.
 - 5. Not exceed twice the rated pressure of closed valves or hydrants included in the test section.
 - 6. Not exceed the rated pressure of resilient-seated butterfly valves.
- C. Pressurization:
 - 1. Slowly fill each valved section of pipe with water.
 - 2. Apply the specified test pressure, based on the elevation of the lowest point of the line or section under test and correct to the elevation of the test gauge by means of a pump connected to the pipe in a manner satisfactory to the Owner.
- D. Air Removal:

1. Before applying the specified test pressure, expel air completely from the pipe, valves and hydrants.
2. If permanent air vents are not located at all high points, install corporation cocks at such points to expel air as the line is filled with water.
3. After all the air has been expelled, close the corporation cocks and apply the test pressure.
4. At the conclusion of the pressure test, remove the corporation cocks and plug or leave in place at the discretion of the Owner.

E. Examination:

1. Carefully examine all exposed pipe, fittings, valves, hydrants and joints.
2. Repair or replace any damaged or defective pipe, fittings, valve or hydrants that are discovered with sound material and repeat the test until it is satisfactory to the Owner.

3.06 ACCEPTANCE OF INSTALLATION

- A. If any test of pipe laid discloses leakage greater than that specified above, locate and repair the defective material until the leakage is within the specified allowance.
- B. Repair all visible leaks regardless of the amount of leakage.

END OF SECTION