

## **SECTION 33 11 00 - WATER PIPE AND APPURTENANCES**

### **PART 1 - GENERAL**

#### 1.01 DESCRIPTION OF WORK:

- A. Provide all labor and equipment necessary to install all pipe, fittings, thrust blocks, and thrust anchors as shown on the drawings or as required for a complete working system.
- B. Provide all labor, equipment, and chemicals necessary to test as specified herein and disinfect the new water system in accordance with AWWA C651-86.

#### 1.02 RELATED SECTIONS:

- A. Section 312000 - Earthwork
- B. Section 312513 - Temporary Erosion Control

#### 1.03 QUALITY ASSURANCE:

- A. Remove damaged pipe, fittings, and valves from the job site.
- B. Testing and installation will be observed by the Owner's Representative and an agent of the Portland Water District.
- C. Standards: All work will be in accordance with Portland Water District Standards.

#### 1.04 SUBMITTALS:

- A. Manufacturer's Technical Product Data and installation instructions for all pipe and fittings and replacement valves if required.
- B. As work progresses, submit as-built sketches to the Owner's representative accurately showing location, type of pipe, and depth of all buried fittings, valves, and ends of pipe.
- C. Reports of all testing and disinfection procedures. Reports will indicate:
  - 1. Date of test.
  - 2. Number of the test including all failed tests.
  - 3. Name of organization and person(s) performing the test.
  - 4. Type of test; i.e., hydrostatic pressure test or disinfection.
  - 5. Time(s): Start Fill, End Fill, Begin Test, End Test.
  - 6. Size, type, length, and location of pipe.

7. Pressure and/or chemical concentration at start of test, at intervals during test where appropriate, and end of test.
8. Certification by tester that test was performed in accordance with AWWA Standards.
9. Signature of Owner's Representative observing the test and a notation that test was approved or rejected. If rejected, reason for rejection will be stated on the report.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS:**

- A. Ductile Iron Pipe: Ductile iron pipe shall conform to the latest edition of AWWA C151 (American Water Works Association standards). Pipe shall be double cement lined with seal coat. The minimum thickness shall be Class 52, unless otherwise agreed to by the Portland Water District. Factory applied bituminous coating shall be furnished on all underground piping. The cement lining shall conform to the latest revisions of AWWA C104.
- B. Fittings: Fittings for ductile iron water shall be ductile or cast iron and shall meet the requirements of AWWA C110. Fittings shall be cement lined in accordance with AWWA C104. The minimum pressure rating for the fitting shall be 250 psi unless a higher-pressure class is required for the specific installation. Unless otherwise required for joint restraint, joints on fittings shall be mechanical joints in accordance with AWWA C111.
- C. Retainer Glands: Retainer glands shall be made of ductile iron with ductile iron set screws. For sizes up to 8 inches the working pressure rating shall be 350 psi and for sizes 8 through 16 inches the working pressure shall be 250 psi. Test pressure shall be at least 2 times the working pressure.
- D. Valves: Gate valves shall be iron body bronze mounted, double disc, parallel seat, mechanical joint, for underground use, wrench operated, non-rising stem, "O-Ring" seal and shall meet or exceed the minimum requirements of AWWA C500. Valves shall be designed for a water working pressure of 250 –Metroseat 250- pounds per square inch. The disc-spreading device shall be constructed of metal; no elastomeric compounds shall be used. Gate valves shall have a 2-inch nut for wrench operation and operating nut shall have an arrow cast in the metal indicating the direction of the opening. Valves shall "OPEN LEFT". Valves shall have maker's initial, pressure rating and a year of manufacture cast on the body.
- E. Valve Boxes: Valve boxes shall be heavy pattern cast or ductile iron, cast in two or three telescoping sections of sliding construction and of such lengths as will provide, without full extension, the required cover. The lower section shall be 5 – 1/4-inch minimum inside diameter and shall be belled or domed at the bottom of fit over the valve nut. The upper section shall fit over the lower section. Covers shall be at least 6 inches in diameter shall fit flush with the top, shall have the word "WATER" cast thereon in raised letters, and shall be coated with coal-tar pitch enamel to other approved coating. Valve boxes shall be suitable for the size valve on which they are used.

- F. Tapping Sleeves and Valves: Tapping valves shall be flanged by mechanical joint meeting the requirements of Gate Valves. The tapping sleeve shall be made of cast or ductile iron and be of the split type with mechanical joint ends.
- G. Thrust Blocks: Thrust blocks shall be precast concrete clocks with a minimum compressive strength of 4000 psi at 28 days. Retainer glands, frictions clamps, and rods may also be required and shall be determined by the Portland Water District on a case by case basis.
- H. Chemicals for Disinfection: As specified in ANSI/AWWA C651-86.
- I. Domestic service Pipe and Fittings: Copper Type K.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. The excavation shall be made to secure a flat bottom trench (undisturbed earth bottom) for the full length of the pipe to give a uniform support to the pipe. Provide a minimum of 5 feet 6 inches of cover. Should the pipe bottom contain unsuitable material, as indicated in Section 312000, the Contractor shall over-excavate and replace with Select Backfill as required and authorized by the Architect. The quantity of unsuitable material will start at the bottom outside of the pipe.

Should ledge be encountered, it shall be removed to a depth of 6" below the bottom of the pipe, and replaced with Select Backfill.

- B. As soon as the excavation is completed and the existing trench bottom has been brought to the proper grade, the pipe shall be laid.
- C. All pipe, before being placed into the trench, shall be inspected and both ends shall be cleaned. Care shall be taken to lay the pipe to the lines shown on the drawings and with a continuous slope toward the well.
- D. Bed and cover pipe with 6" of sand.
- E. Plug ends of pipe watertight, except when making connection to another length or a lateral service.
- F. Do not lay pipe in water or when trench conditions or weather are unsuitable for such work.

#### **3.02 TESTING AND DISINFECTION:**

- A. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipe line 24 hours prior to testing, and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.

Test fails if leakage exceeds 2 quarts per hour per 100 gaskets or joints, irrespective of pipe diameter. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

C. Cleaning:

1. Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C651-86 "Standard for Disinfecting Water Mains."

\* END OF SECTION 33 11 00 \*