SECTION 15044
HYDROSTATIC TESTING OF PRESSURE PIPELINES

PART 1 GENERAL

1.01 DESCRIPTION

This section describes the requirements and procedures for pressure and leakage testing of all pressure mains.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for:

AWWA C600 Installation of Ductile Iron Water Mains

1.03 RELATED WORK SPECIFIED ELSEWHERE

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<th>Disinfection of Pipe</th>
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<td>Section 15112</td>
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1.04 REQUIREMENTS PRIOR TO TESTING

A. All piping, valves, fire hydrants, services, and related appurtenances shall be installed prior to testing.

B. The pipe trench shall have trench zone backfill placed and compacted with a minimum of 2.5 feet of material over the pipe.

C. All concrete anchor blocks shall be allowed to cure a sufficient time to develop a minimum strength of 2,000 psi before testing.

D. Pressure tests on exposed and aboveground piping shall be conducted only after the entire piping system has been installed and attached to pipe supports, hangers or anchors as shown on the Approved Plans.

E. Steel pipelines shall not be tested before the mortar lining and coating on all pipe lengths within the line have been in place for a minimum of seven(7) days. Cement-mortar lined pipe shall not be filled with water until a minimum of eight hours has elapsed after the last joint has been mortared.

1.05 HYDROSTATIC TESTING AND DISINFECTION OF PIPELINES

Hydrostatic testing of pipelines shall be performed prior to the disinfection operations in accordance with Section 15041.
1.06 CONNECTION TO EXISTING MAINS

Hydrostatic testing shall be performed prior to connections to existing mains. District authorization for connection to the existing system shall be given only on the basis of acceptable hydrostatic, disinfection and bacteriological test results.

PART 2 MATERIALS

2.01 WATER

A. Potable water shall be used for hydrostatic testing of potable water mains when such testing is performed separately from disinfection operations.

B. Potable water shall be supplied by a District approved source. Make-up water for testing shall also be potable water.

C. Well water shall not be used for hydrostatic testing or any other purposes in new or existing pipelines.

2.02 CONNECTIONS

A. Testing water shall be supplied through a metered connection equipped with a backflow prevention device in accordance with Section 15112 at the point of connection to the potable water source used.

B. The Contractor shall provide any temporary piping needed to deliver potable water to the piping that is to be tested.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall provide the District Engineer with a minimum of five (5) working days notice prior to the requested date and time for hydrostatic tests.

B. The Contractor shall furnish all labor, materials, tools, and equipment for testing.

C. Temporary blocking during the tests will be permitted only at temporary plugs, caps or where otherwise directed by the District Engineer.

D. All valves and appurtenances shall be operated during the test period. The test shall be conducted with valves in the open position.

E. At the onset of testing, all valves, air vacuum assemblies, blowoffs, and services shall be monitored for possible leakage and repairs made, if necessary, before the test proceeds. The appurtenances shall be monitored for the duration of testing.

F. For pipe with porous lining, such as cement mortar, the pipe shall be filled with water and placed under a slight pressure for a minimum of two (2) working days prior to the actual hydrostatic test.
3.02 FIELD TEST PROCEDURE

A. Before applying the specified test pressure, care shall be taken to release all air within the pipe and appurtenances to be tested. Air shall be released through services, fire hydrants, air release valves, or other approved locations.

B. A five (5) hour hydrostatic pressure test shall be performed after the pipe and all appurtenances have been installed and after any trench backfill compaction with heavy-duty compaction equipment has been completed. The hydrostatic test pressure shall be 50 psi above the class rating of the pipe at the lowest point in the section being tested and shall be at least equal to the design class of the pipe at the highest point in the line.

C. The test pressure shall be applied and continuously maintained by pumping for a period of four (4) hours. During the pumping phase of the test, the test pressure shall be maintained within 5 psig of the specified test pressure at all times.

D. At the end of the fourth (4th) hour, the pressure shall meet the requirements stated above. Pumping shall then be discontinued for one (1) hour and the drop in pressure shall be recorded. Pumping shall then be resumed to restore the initial test pressure, and the quantity of water pumped into the line shall be accurately measured. This measured quantity shall not exceed that which would result from leakage at the following rates:

1. The allowable leakage for steel (flanged or welded) and ductile iron (flanged) pipe shall be zero.

2. The leakage for polyvinyl chloride (PVC) pipe and for steel or ductile-iron pipes with rubber joints shall be considered as the total amount of water pumped into the pipe system after the fifth (5th) hour of testing. Allowable leakage during the fifth (5th) hour shall be in accordance with AWWA C600-99 and calculated using the following formula:

   \[ L = \frac{S \cdot D \cdot (P)^{0.5}}{133,200} \]

   \( L \) = testing allowance (gallons / hour)
   \( S \) = length of pipe tested (feet)
   \( D \) = nominal diameter of pipe (inches)
   \( P \) = average test pressure during test (pounds / sq. inch (gage))

3. If leakage exceeds the allowable loss, the leak points shall be located and repaired as required by the District Engineer. All defective pipe, fittings, valves, and other appurtenances discovered shall be removed and replaced with reliable material. Additional disinfection shall be performed as necessary per Section 15041. The hydrostatic test shall be repeated until the leakage does not exceed the rate specified above. All visible leaks shall be similarly repaired.

END OF SECTION