

ITEM W34 – APPENDIX ‘D’

WATER LINE TESTING

1.0 DESCRIPTION. This work shall consist of the disinfecting and testing of a potable water pipeline in accordance with these specifications or as established by the Engineer. This work shall include performing hydrostatic leakage tests as specified, disinfecting and restoration of disturbed facilities and surfaces. Arrangement for and the performance of the adequate and satisfactory disposal of all test and disinfection waters shall be the Contractor's responsibility. The Contractor shall chlorinate the water main as often as necessary to achieve an approved potable water test.

2.0 PROCEDURE. Each section of piping to be disinfected and tested:

A. Reference Standards.

1. Refer to applicable Specification sections:
 - a. W11 Ductile Iron Pipe and Fittings.
 - b. W14 PVC Pipe.
2. AWWA C651.
3. AWWA C605.

B. Shop Drawings. This section is not applicable.

C. Calculations.

1. Refer to applicable Specification sections.

D. Certifications. This section is not applicable.

2.0 MATERIALS. Only test materials approved by the Stark County Metropolitan Sewer District may be used for this project.

3.0 EXECUTION. The Contractor shall provide all laborer, materials, equipment, and tools necessary to disinfect and test the water main, fittings and all ancillary components complete, in the locations as shown on all detailed drawings and specified as below. Purging of over-chlorinated water, refilling, providing bacteriological samples, any restoration required, and all other work required to commission the waterline for service are also required.

4.0 ELECTRICAL. This section is not applicable.

5.0 QUALITY ASSURANCE. The work covered under this section of the Specification is intended to be the work, materials, labor, and equipment required to test the water main as described above. All material used on this project shall be new and unused unless otherwise specified and all workmanship shall be of the best quality. Only qualified and skilled workmen/women shall be employed for all phases of this project. All workmen/women shall be trained in trench safety.

A. Testing.

1. Hydrostatic leakage testing shall be used to test the waterline.
2. **Under no circumstances shall air testing be performed on plastic pipe or any portion thereof.**

B. Leakage Testing.

1. For waterline pipe, the leakage tests as specified herein or as directed by the Engineer shall govern. Generally, the line shall be filled and allowed to stand for twenty-four (24) hours and then hydrostatically tested for two (2) hours in duration with the leakage and pressure recordings being conducted simultaneously.
2. The test pressure shall not vary by more than five (5) psi from the start pressure for the duration of the test.
3. A two hour hydrostatic test shall be performed in accordance with AWWA C605. This includes but is not limited to:
 - a. Test pressures shall not exceed the rated working pressure of any component.
 - b. Pressures shall not be less than 1.25 times the anticipated working/zone pressures.
 - c. Test allowance quantity of water, in gallons per hour, supplied to maintain pressure within 5 psi shall not exceed:

$$\frac{L \times D \sqrt{P}}{148,000}$$

Where: L = length of pipe tested
D= nominal pipe diameter
P= average test pressure (gauge)

C. Disinfection.

1. Disinfecting water mains shall be in accordance with AWWA C651 Specifications, Disinfecting Water Mains, and as detailed below.
2. The Continuous-Feed Method, AWWA C651, Sec. 5.2, shall be used to disinfect all new water mains, unless approved for other AWWA methods by the Engineer.
 - a. The other methods that can be used with the approval of the Engineer are the Tablet Method, AWWA C651 Sec. 5.1, and the Slug Method, AWWA C651 Sec. 5.3.
3. Continuous-Feed Method: Prior to disinfection, all pipeline construction shall be flushed to remove any foreign material.
 - a. Flushing shall be performed after completion and approval of the leakage tests.

- b. The minimum requirements for flushing are as follows:

TABLE 1	
NOMINAL DIAMETER (INCHES)	MINIMUM GPM REQUIRED
<i>8"</i>	<i>400</i>
<i>10"</i>	<i>600</i>
<i>12"</i>	<i>900</i>

- c. Flushing at these rates shall be continued for at least five (5) minutes.
- i. In the event the foregoing requirements cannot be met due to the Owner's facilities being inadequate, alternate rate(s) and duration(s) of flushing shall be as directed by the Engineer.
- d. The following disinfectants may be used: Calcium hypochlorite (HTH®, etc.) Disinfectant shall be applied at one extremity of a pipe section via a corporation stop (installed in the top of the pipe).
- e. The rate of applying the disinfectant shall provide at least 25 ppm (mg per liter) chloride dose at the outlet end of the line section being treated.
- f. The disinfecting period shall be twenty-four (24) hours, and, at the end of this period, a chlorine residual of at least 10 mg per liter shall exist at the outlet end of the line.
- i. In the event of unfavorable or unsanitary conditions of installation, poor packing or high pH, the period of disinfectant may be extended.
 - ii. The shorter periods of disinfection, higher dosages shall be required.
4. If the foregoing disinfection procedure fails to provide thorough disinfection of the line, it shall be repeated as necessary.
5. Tests for adequacy of sterilization shall be made by the Engineer, and repeated sterilization shall be carried out by the Contractor when required.
6. Sterilizing water shall be disposed of in a satisfactory manner by the Contractor.
- a. No direct discharges of disinfection waters will be allowed to storm sewers or streams without removing the chlorine residual by proper dilution or chemical means.
7. Contractor shall provide all disinfectants and disinfection equipment.
8. The Contractor shall be charged for all water to be used/wasted in conjunction with this project, including but not limited to, water required for sterilization and disinfection flushing.
- a. The contractor shall be charged the current rate for this water.
 - b. The minimum weekly charge for water used will be \$100.
 - c. All water wasted for disinfection shall be measured using hydrant meters.
 - d. The Engineer will supply two (2) meters for use on this project by the Contractor.

D. Observation.

1. SCMSD designated representative will visually observe the work performed. The representative will notify the Engineer of any discrepancies with the contract

documents in the course of the contractor performing the work. The progress observations by the SCMSD do not waive any rights or remedies, nor divest the Contractor of any responsibility for contract compliance or liability for damage.

6.0 MEASUREMENT. The number of lineal feet of water main to be tested under this item shall be the actual length of water main constructed as measured along the center line of the pipe. Such measurement shall also include fittings, valves, tees, etc. and paid under respective items.

END OF SECTION