STANDARD SPECIFICATIONS

SECTION 15042

HYDROSTATIC TESTING OF PRESSURE PIPELINES

PART 1 - GENERAL

A. Description

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

B. Related Work Specified Elsewhere

All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).

Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

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C. Connection to Existing Mains

The test shall be made before connecting the new line with the existing District pipes and mains.

D. Tester

All testing shall be performed by a District-approved testing company, who will be required to provide the District representative with certified testing results. Tester will have a gage and meter, calibrated annually.

E. Requirements Prior to Testings

1. Before testing, the pipe trench shall be backfilled and compacted to the ground surface per Section 02223.

2. All concrete anchor blocks shall be allowed to cure a sufficient time to develop a minimum strength of 2,000 psi, but not less than five (5) days, before testing, unless otherwise directed by the District representative.

3. Steel pipelines shall not be tested before the mortar lining and coating on all of the pipe lengths in the line have attained an age of 14 days. Cement-mortar lined pipe shall not be filled with water until a minimum period of eight hours has elapsed after the last joint in any section has been made.

4. All surrounding utilities shall be installed prior to testing.

F. Final Pavement

All pipeline shall be satisfactorily pressure tested prior to the placement of final pavement.

PART 2 - MATERIALS

A. Water

1. The same water used for chlorination of the pipeline may be used to fill the line for pressure testing.

2. Make up water for testing shall be domestic water.

PART 3 - EXECUTION

A. General

1. All labor, materials, tools, and equipment for testing shall be furnished by the contractor.

2. The pipeline shall be subjected to a field hydrostatic pressure of 225 psi or 50 psi in excess of the anticipated working pressure of the pipe being tested, whichever is greater, for a period of four hours.

3. The water necessary to maintain test pressure shall be measured through a meter. The leakage shall be considered as the amount of water entering the pipe during the test, less the measured leakage through valves and fittings. Leakage shall not exceed the rate specified. Any noticeable leaks shall be stopped, and any defective pipe shall be replaced with new sections.

4. The test shall further be conducted with valves open, and the open ends of pipes, valves, and fittings suitably closed. Valves shall be operated during the test period.

5. In hilly areas, it may be necessary to conduct the test in segments so that no pipe section is tested at less than the pipe pressure class plus 50 psi, nor more than 1½ times the pipe pressure class.

B. Field Test Procedure

1. The pipeline should be filled at a rate such that the average velocity of flow is less than 1 fps. At no time shall the maximum velocity of flow exceed 2 fps. The following table has been provided to relate the velocity filling rate to an equivalent volume flow rate.

Filling Rate in gpm equivalent to filling velocities of 1 fps

Normal Size (inches)	Flow Rate Q (gpm)
4	38
6	88
8	158
12	353
16	624

2. All air should be purged from the pipeline before checking for leaks or performing pressure or acceptance tests on the system. To accomplish this, if air valves or hydrants or other outlets are not available, taps shall be made at the high points to expel the air, and these taps shall be tightly plugged afterwards.

3. After the pipeline has been filled and allowed to sit a minimum of 24 hours (48 hours for mortar-lined pipelines), the pressure in the pipeline shall then be pumped up to the specified test pressure. If a large quantity of water is required to increase the pressure during testing, entrapped air, leakage at joints, or a broken pipe can be suspected. TESTS SHOULD BE DISCONTINUED until the source of trouble is identified and corrected.

4. When the test pressure has been reached, the pumping shall be discontinued until the pressure in the line has dropped 25 psi, at which time the pressure shall again be pumped up to the specified test pressure. This procedure shall be repeated until four hours have elapsed from the time the specified test pressure was first applied. At the end of the four-hour period, the pressure shall be pumped up to the test pressure for the last time.

5. The leakage shall be considered as the total amount of water pumped into the pipeline during the four-hour period, including the amount required in reaching the test pressure for the final time. Leakage shall not exceed the rates in the tables below. If the size, pipe material, or pressure fall outside of the table listed below, the leakage amount will be determined by the Director of Engineering.

DIP LEAKAGE ALLOWANCE

Pipe Size (inches)	Test Pressure (psi)	Allowable Leakage Gallons per four hours per 1,000 feet of pipe
4	225	1.8
6	225	2.7
8	225	3.6
12	225	5.4
16	225	7.2
20	225	9.0
24	225	10.8

PVC LEAKAGE ALLOWANCE

	Test Pressure		Allowable Leakage Gallons per four hours per 1,000 feet of pipe	
Pipe Size (inches)	Class 150 (psi)	Class 200 (psi)	Class 150	Class 200
4	225	250	1.7	1.9
6	225	250	2.6	2.8
8	225	250	3.4	3.8
12	225	250	5.1	5.7

STEEL PIPE ALLOWANCE

For steel pipe, the allowable loss rate shall be determined by the following formula:

$$L=\frac{HND(P)^2}{7,400}$$

In which:

L	=	Allowable loss (gallons)
H	=	Specific test period (hours)
N	=	Number of rubber-gasketed joints in the pipe tested *
D	=	Diameter of the pipe in inches
P	=	Specified test pressure (psig)

* Flanged, welded and grooved joints shall have zero leakage. The test period shall be four hours for 24-inches in diameter and smaller pipe. The test period shall be eight hours for pipes greater than 24-inches in diameter.

6. Any noticeable leak shall be stopped and all defective pipe, fittings, valves, and other accessories discovered in consequence of the test shall be removed and replaced by the contractor with sound material, and the test shall be repeated until the total leakage during a test of four hours (4) duration does not exceed the rate specified above.

END OF SECTION