

STANDARD SPECIFICATION
SECTION 15144 PRESSURE TESTING OF PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes pressure and leakage testing of pressure pipelines and appurtenances for transmission and distribution mains.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Standard Drawings.
- B. Record Drawings and Submittals: STD SPEC 01300.
- C. Disinfection of Piping: STD SPEC 15141.

1.03 SUBMITTALS

- A. Submit submittal packages in accordance with Standard Specification Section 01300.
- B. Submit test bulkhead locations, pipe attachment details, methods to prevent excessive pipe wall stresses, blocking to overcome thrust conditions and design calculations.
- C. Submit request for use of water from waterlines of District 48 hours in advance.

PART 2 - MATERIALS

2.01 TEST BULKHEADS

Design and fabricate test bulkheads per Section VIII of the ASME Boiler and Pressure Vessel Code. Materials shall comply with Part UCS of said code. Design pressure shall be at least 2.0 times the specified test pressure for the section of pipe containing the bulkhead. Limit stresses to 70-percent of yield strength of the bulkhead material at the bulkhead design pressure. Include air-release and water drainage connections.

2.02 TEST OUTLETS AND TEMPORARY VALVES

Provide additional outlets and temporary valves for releasing air or apply the test where automatic air valves or other outlets are available in the pipeline. Construct the outlets in the same manner as for a permanent outlet and after use, seal with a blind flange, pipe cap, or plug and coat equal to the adjacent pipe.

2.03 TEST FLUID AND TEMPORARY PIPING

Use only potable water for the hydrostatic pressure test. Provide a reduced pressure backflow prevention assembly if source of potable water is from District waterlines. Provide temporary piping to convey and dispose of the test fluid used in the pipeline. Disconnect and remove temporary piping after complying with the allowable leakage.

2.04 TEST EQUIPMENT

Provide calibrated pressure gauges, calibrated recorder, pipes, pumps, meters, and other equipment necessary to perform the hydrostatic test.

PART 3 - EXECUTION

3.01 TESTING PREPARATION

- A. Subject the pipeline and appurtenances to a hydrostatic pressure test after the pipe has been laid and backfilled for required restraint. Allow concrete pipe anchors, collars, encasements and thrust blocks to cure for at least 7 days prior to pressure testing. Allow concrete structures to attain the specified 28-day compressive strength prior to testing. Existing facilities will be operated by or under direction of the District's Representative only.
- B. Provide any temporary piping needed to carry the test fluid to the piping that is to be tested. After the test has been completed and demonstrated to comply with the specifications, disconnect and remove temporary piping. Do not remove exposed vent and drain valves at the high and low points in the tested piping; remove any temporary buried valves and cap the associated outlets. Plug taps or connections to the existing piping from which the test fluid was obtained.
- C. Provide temporary drain lines needed to carry testing fluid away from the pipe being tested. Remove such temporary drain lines after completing the pressure testing.

3.02 CLEANING

Before conducting hydrostatic pressure tests, flush pipes with water to remove dirt and debris. Maintain a flushing velocity of at least 3 fps for water testing. Flush pipes for time period as given by the formula:

$$T = \frac{2L}{3}$$

in which:

T = flushing time (seconds)

L = pipe length (feet).

3.03 TESTING AND DISINFECTION SEQUENCE

- A. Perform required disinfection after pressure testing, except when pipeline being tested is connected to a potable water pipeline.
- B. Locate and install test bulkheads, temporary valves and connections to existing pipelines, and other appurtenances in a manner to provide air gap separation between existing potable water pipelines and pipeline being tested. Disinfect water and pipeline being tested before pressure testing when connected to a potable water pipeline.
- C. See Standard Specification Section 15141 for chlorination requirements.

3.04 LENGTH OF TEST SECTION

Test the pipeline in sections. In any one test, do not exceed more than 2,500 feet, the distance between closed valves, or as directed by the District's Representative.

3.05 INITIAL PIPELINE FILLING

Maximum rate of filling with test fluid shall not cause water velocity in pipeline to exceed one foot per second. Expel air from the pipeline while filling and prior to testing. Provide necessary outlets to fill and test pipeline. Allow 72 hours for the water filled pipeline to soak and release entrapped air prior to testing.

3.06 TESTING NEW PIPE WHICH CONNECTS TO EXISTING PIPE

Prior to hydrostatic pressure testing new pipelines which are to be connected to existing pipelines, isolate the new pipeline from the existing pipeline by means of test bulkheads, spectacle flanges, or blind flanges. After the new pipeline has been successfully pressure tested, see Standard Specification Section 15141 for instructions to continue with the disinfection and connection work.

3.07 PRESSURE AND DURATION OF TEST

- A. Base pipeline test pressures on the test hydraulic gradient elevation (HGL) as shown on the Drawings. Test pressure shall be the difference between the test HGL elevation and the invert elevation of the pipeline at the low point in the test section multiplied by 0.433 (psi). If no test HGL is shown, subject the pipeline at the low point in the test section to a hydrostatic test pressure which is 50 psi in excess of the rated class pressure of the pipe.
- B. Maintain the pipeline test pressure for the following duration and restore the test pressure whenever it drops 5 psi. Use a calibrated recorder during the test and provide a record of the test to the District.

Nominal Pipe Size (inches)	Duration of Test (hours)
18 and less	4
20 and greater	8

3.08 ALLOWABLE LEAKAGE

- A. Apply the test pressure with a positive displacement pump. Provide a snubber or dampener between the pump and the pipeline to reduce instantaneous pressure pulses to 10-percent of the test pressure. Draw test fluid from containers in which the volume of water can be readily measured or through a positive displacement meter.
- B. Leakage shall be considered as the total amount of water pumped into the pipeline during the test period. The allowable leakage for aboveground and buried piping having threaded, soldered, welded, flanged, push-on joint, mechanical joint, and rubber gasket joint shall be zero.

3.09 REPETITION OF TEST

If the actual leakage exceeds the allowable, locate and correct the faulty work and repeat the test until the leakage does not exceed the allowable. Restore the work and all damage resulting from the leak and its repair. All visible leakage shall be eliminated.

3.10 BULKHEAD AND TEST FACILITY REMOVAL

After a satisfactory pressure test and disinfection, drain the water; remove test bulkheads, temporary valves and piping, and other test facilities; connect to existing facilities; and restore the pipe coatings.

END OF SECTION