



TOWN OF PLYMOUTH

Department of Public Works

SEWER DIVISION

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SEWER TESTING SPECIFICATIONS

GRAVITY SEWER TESTING

Gravity sewers, including laterals, shall be air tested for leakage after backfilling and compaction to the road sub-grade has been completed, and the base course of bituminous concrete has been installed. The equipment and method used to conduct the air test will be subject to prior approval of the Department's authorized representative or the Engineer. The Contractor shall furnish all labor and equipment for testing. No sewers will be accepted by the Department until all testing is completed to the satisfaction of the Department's authorized representative or the Engineer.

A section between two manholes shall be isolated by inflatable plugs. Air shall be introduced into the pipeline to an internal pressure 4 pounds per square inch (psi) greater than the average back pressure of the ground water, or an increase of .434 psi for each foot of water above the top of the pipe. After stabilizing the pressure at 3.5 psi minimum, the airline shall be disconnected, and the pressure drop, if any, observed. The line shall be termed acceptable if the time required, in minutes, for the pressure to decrease to 2.5 psi is not less than 1 minute per inch of diameter. The Contractor shall repair all leaks and a second test shall be made to determine the acceptability of the work.

Cleaning and Visual Inspection:

After laying of the pipe is completed between manhole sections, the interior of the sewer pipe line shall be thoroughly cleaned from construction debris or other foreign matter using a high pressure sewer jetting machine. The completed section of pipe shall be closed off by bulkheads at the outlet side of the manholes in a manner which is sufficient to prevent the wash of mud or dirt into the completed section of pipeline. Upon completion of the entire line the bulkheads shall be removed and all debris shall be removed from the pipe and manholes. Prior to acceptance, the Engineer or the Department's authorized representative shall conduct a visual inspection of the pipeline and the Contractor shall supply all materials and labor necessary for this inspection.

Deflection Test:

All sewer pipe shall be checked for deflection after backfilling and compaction is complete, but at no time shall construction proceed further than 500 linear feet from the last section tested. The pipeline to be checked shall be thoroughly cleaned and plugged. A mandrel shall be pulled through the pipe to check overall deflection, and the pipe through which a mandrel cannot be pulled without extreme force, shall be considered failed. The mandrel shall have an O.D. 5% less than the pipe I.D., and shall be supplied by the pipe manufacturer for this purpose. Pipe which has deflected more than 5% shall be excavated, and replaced or backfill around the pipe compacted to provide adequate support, and the pipe retested. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and divided by the nominal diameter of the pipe.

Television Inspection:

All gravity sewer lines which total more than five hundred (500) linear feet in length or contain more than four (4) service connections or has a failure of testing shall be televised.

The television camera used for the inspection shall be a three hundred sixty (360) degree pan and tilt camera specifically designed and constructed for inspection of sewer lines. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in one hundred (100) percent humidity conditions and have a minimum of six hundred (600) line-resolutions. Picture quality and definition shall be to the complete satisfaction of the Department and if unsatisfactory, the equipment shall be removed and replaced with equipment of satisfactory quality.

The inspection shall be done one section at a time and the section being inspected shall be suitably isolated from the remainder of the sewer system as required. The camera shall be moved through the line in either direction at a uniform slow rate by means of cable winches located at manholes on each side of section being televised. Means of communications shall be set up between the two winches and the monitor control. Photographic pictures shall be taken of the television monitor at all defects and when directed by the Department.

The Contractor shall submit a typed written report including television inspection logs for all work performed. These logs at a minimum should include: stationing, location of reference points, point of entry of service connections via a clock system, observed running leaks, observed continuously running service connections, bad joints, sags in pipes, and other evidence of potential problems.

FORCE MAIN TESTING

Force main pipes shall be tested by slowly filling the line with water and expelling the air at the discharge end of the force main. The discharge end shall then be plugged and blocked and the pressure inside the force main raised to two (2) times the pump discharge pressure or maximum of the design working pressure of the pipe. The amount of water added to the pipeline, to maintain this pressure for thirty (30) minutes, shall be metered and if the amount added exceeds one (1) gallon, the pipe shall be considered to have failed the test.

MANHOLE TESTING

All manholes shall be vacuum tested by the Contractor. All testing shall be performed under the observation of the Department's authorized representative or the Engineer. The Contractor shall be responsible for providing all labor and equipment required to complete the tests. Individual manholes shall be tested by plugging all inlet and outlet piping and placing an approved vacuum base at the top of the manhole cone section. An initial vacuum of 10 inches of mercury shall be drawn. The test time shall be that time allowed for the pressure to drop from 10 inches of mercury to 9 inches of mercury.

Maximum allowable test times shall be as follows:

<u>Manhole Depth</u>	<u>Maximum Test Time</u>
0 to 10 feet	2 minutes
10.1 to 15 feet	2 minutes 30 seconds
15.1 to 25 feet	3 minutes

Manholes which fail to meet the above allowable test times shall be repaired using methods approved by the Department's authorized representative or the Engineer. Manholes shall then be retested using the vacuum test. Following a second vacuum test failure, the manhole shall be repaired and tested using a water exfiltration method as determined by the Department's authorized representative or the Engineer.