



CLACKAMAS

**WATER
ENVIRONMENT
SERVICES**

Return to:
Clackamas Water Environment Services
150 Beaver Creek Rd., Suite 430
Oregon City, OR 97045

LOW PRESSURE AIR / MANDREL TEST RESULTS

PROJECT: _____

DATE: _____

CONTRACTOR: _____

PROJ #: _____

TESTING COMPANY: _____

INSPECTOR: _____

LOW PRESSURE AIR TEST RESULTS							MANDREL
UPSTREAM MANHOLE #	DOWNSTREAM MANHOLE #	(T) REQUIRED AMOUNT OF TIME (sec)	(d) PIPE DIA. (inches)	(L) LENGTH OF PIPE (ft)	(G) GROUND WATER HEIGHT (ft)	AIR TEST PASS / FAIL	MANDREL PASS / FAIL

Calculating Time (T) - Low Pressure Air Test

1. Minimum Testing Times: See the table on the back of this form for the "LOW AIR TEST MINIMUM TESTING TIME".
2. The pipeline shall be considered acceptable when tested as described herein before if the section under test does not lose air at a rate greater than 0.0015 cfm per square foot of internal sewer surface. The following formula shall be used for calculating (T) for lengths of pipe and diameter of pipes not shown in the table referenced above.

$$T = (d^2)(L/42)$$

T = test duration, seconds
d = pipe diameter, inches
L = section length, feet
42 = conversion factor

$$\text{Test PSI} = (4.0) + (G/2.31)$$

G = Ground Water height in ft

NOTE: All sanitary sewer testing will be performed in accordance with WES Sanitary Sewer Standard, Section 6. The Engineer or Engineer's Inspector will certify the above results by signing this form.

Engineer or Engineer's Inspector's Signature: _____

Procedure for Air Testing of Sewer Pipe & Appurtenances

- (1) Summary of Method: Plug the section of the sewer line to be tested. Introduce low-pressure air into the plugged line. Use the quantity and rate of air loss to determine the acceptability of the section being tested.
- (2) The Contractor may desire to make an air test prior to backfilling for his own purposes. However, the acceptance air test shall be made after backfilling and compaction has been completed to finish grade.
- (3) Preparation of the sewer line: Flush and clean the sewer line prior to testing, thus serving to wet the pipe surface as well as clean out any debris. A wetted interior pipe surface will produce more consistent results. Plug all pipe outlets using approved pneumatic plugs with a sealing length equal to or greater than the diameter of the line being tested to resist the test pressure. Give special attention to service connections.
- (4) Infiltration: The District does not allow new construction of sanitary sewer piping system to have any visible sign of ground or surface water infiltration. If infiltration into the sanitary sewer piping system is visible it will need to be corrected prior to proceeding with any sanitary sewer testing.
- (5) Ground Water Determination: Install a 1/2 inch capped galvanized pipe nipple, approximately 12 inches long, through the manhole on top of the lowest sewer line in the manhole. Immediately prior to the line acceptance test, the ground water elevation shall be determined by removing the pipe cap and blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic hose to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in the plastic hose.
- (6) Procedures: Determine the test duration for the section under test by computation from the applicable formulas shown in ASTM C828. The pressure-holding time is based on an average holding pressure of 3 psi gage or a drop from 3.5 psi to 2.5 psi gage.

Add air until the internal air pressure of the sewer line is raised to approximately 4.0 psi gage. After an internal pressure of approximately 4.0 psig is obtained, allow time for the air pressure to stabilize. The pressure will normally show some drop until the temperature of the air in the test section stabilizes.

When the pressure has stabilized and is at or above the starting test pressure of 3.5 psi gage, commence the test. Before starting the test, the pressure may be allowed to drop to 3.5 psig. Record the drop in pressure for the test period. If the pressure has dropped more than 1.0 psi gage during the test period, the line shall be presumed to have failed. The test may be discontinued when the prescribed test time has been completed even though the 1.0 psig drop has not occurred.

The test procedure may be used as a presumptive test which enables the installer to determine the acceptability of the line prior to backfill and subsequent construction activities.

If the pipe to be tested is submerged in ground water, the test pressure shall be increased to 1.0 psi for every 2.31 feet the ground water level is above the invert of the sewer.

(7) Safety: The air test may be dangerous if, because of lack of understanding or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. In as much as a force of 250 lb./f. is exerted on an 8 inch plug by a internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous. As a safety precaution, pressurized equipment shall include a regulator or relief valve set at perhaps 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing.

Mandrel Testing Procedures

(1) In addition to low pressure air testing, sanitary sewers constructed of PVC sewer pipe shall be tested for deflection not less than 30 days after the trench backfill and compaction has been completed. The test shall be conducted by pulling an approved solid pointed mandrel through the completed pipeline. The diameter of the mandrel shall be an effective length of not less than its nominal pipe diameter. The mandrel shall be a rigid, nonadjustable with an effective length of not less than the pipe nominal diameter.

(2) Testing shall be conducted on a manhole to manhole basis and shall be done after the line has been completely cleaned and flushed. Any portion of the sewer which fails to pass the test shall be excavated, repaired or realigned, and retested with both air and deflection tests.

LOW AIR TEST MINIMUM TESTING TIME			
(d) Pipe Dia. Inches	(T) Minimum seconds	(L) Minimum feet	(T) for Addition Length (T/L) seconds / foot
6	340	398	0.855
8	454	298	1.520
10	567	239	2.374
12	680	199	3.419
15	850	159	5.342
18	1020	133	7.693
21	1190	114	10.471
24	1360	100	13.676
27	1530	88	17.309
30	1700	80	21.369