SPECIAL SPECIFICATION
5917
Low Pressure Air Test - Sanitary Sewer Lines

1. General.

(1) Scope. The Contractor shall furnish all labor, tools, and equipment and perform all operations in connection with low-pressure air testing on completed sanitary sewer lines. Testing shall be completed after the gravity sewer line has been laid and backfilled, but prior to replacement of pavement, subject line to low-pressure air test. Test shall be performed using equipment denoted hereinafter.

(2) Related Requirements. Pipe per applicable pipe specified within Specification Section(s) included with these Contract Documents and/or as shown on Plans.

(3) References. The publications listed below form a part of this Specification Referenced. The publications are referred to in the text by basic designation only.

American Society for Testing and Materials (ASTM)

2. Execution.

(1) Erection/Installation/Application and/or Construction.

(a) General. The procedure for low-pressure air test shall conform to the procedures described in ASTM C828 and F1417, or other appropriate procedures except for testing.

The Contractor shall take such precautions as necessary to prevent damage to lines and appurtenances being tested and shall repair any damage resulting from testing, at his expense, with no additional cost to the owner. All testing shall be completed in presence of the Engineer.

(b) Equipment.

1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe tested.

2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
3. One of the pneumatic plugs shall have an inlet tap or other provisions for connecting air supply to introduce low-pressure air into the line for testing.

4. All air used shall pass through a single control panel.
   A. From control panel to pneumatic plugs for inflation.
   B. From control panel to a sealed line for introducing low-pressure air.
   C. From sealed line to control panel for continuous monitoring air pressure in sealed line.

5. Air supply system shall have necessary valves and gauges to control rate at which air enters test section and for reading test results.

6. Pressure gauges shall have minimum gradations of 0.1 psig and accuracy of plus or minus 0.05 psig.

(c) Pretesting Procedures.

1. The Contractor shall determine groundwater levels that may exist above the pipe to be tested. Acceptable methods of determination of groundwater levels shall consist of piezometers or open excavation (when authorized by the Engineer). The total number of installations, regardless of methods selected, shall be sufficient enough so as to adequately conclude the groundwater height above the invert of the segment or segments of gravity sewer being tested.

2. Upon determination of stabilized static groundwater depth level, the height above the pipe invert shall be divided by 2.3 ft. to establish psi of back pressure and added to all readings as described in Subsection 2.(1)(e)5.

3. No low pressure air test shall be conducted until such time that it has been demonstrated that the groundwater level has fully stabilized.

4. When piezometer method has been selected it shall be temporarily capped after initial installation and fully protected from damage until completion and acceptance of low pressure air test.

5. When pre-approved open excavation method is implemented it shall be installed in accordance with all federal, state, and local safety and health regulations, laws, and or ordinances. The open excavation method shall not be conducted in any area that may affect or disturb the structural integrity of the gravity line being tested or any adjacent structure(s) or utilities.

6. Upon completion and acceptance of low pressure air test(s), the Contractor shall be responsible for removal, backfilling, and restoration of areas affected by piezometers or in the case of open cut method, shall be responsible for backfill, compaction and restoration of affected areas. In each case backfilling, compaction and restoration shall be in accordance with applicable specifications.
(d) **Preparations of Sewer Lines.** The Contractor shall flush and clean sewer line prior to testing, providing a wet pipe surface and removing any debris prior to testing. The Contractor shall plug all pipe outlets to resist test pressure.

(e) **Testing Procedures.**

1. The Contractor shall seal test all pneumatic plugs before using in test installation. He shall then lay 1 length of pipe on ground and seal it at both ends, with pneumatic plugs to be checked. The Contractor shall introduce air into pneumatic plugs at 25 psig. The sealed pipe shall be pressurized to 5 psig. Plugs shall hold against this pressure without external bracing.

2. The Contractor shall carefully observe safety precautions during air testing, recognizing damages from plugs blowing out. No one shall be allowed in manholes during test.

3. Place pneumatic plugs in line at each manhole and inflate to 25 psig. Introduce low pressure air into sealed line until internal air pressure reaches a pressure of 5 psig plus the average groundwater backpressure. Allow 2 minutes for internal air pressure to stabilize.

4. When internal air pressure has stabilized and is at or above test pressure (3.5 psig minimum plus groundwater backpressure), commence test. Disconnect air hose from control panel to air supply. Record pressure drop for test period. If pressure drops more than 1 psig during test period, line is presumed to have failed. Test may be discontinued when prescribed test time has been reached even though 1 psig drop has not occurred.

5. Time required for pressure to decrease from 3.5 psig to 2.5 psig (greater than average groundwater backpressure over pipe) shall not be less than time shown for given diameter in the following table. Times shown are based on loss of air not to exceed 0.0015 cu. ft. per min. per sq. ft. of internal pipe surface tested at an average pressure of 3 psi greater than groundwater back pressure.

<table>
<thead>
<tr>
<th>Pipe Dia. (Inches)</th>
<th>Time for Longer Length (Seconds)</th>
<th>Length for Min. Time (Feet)</th>
<th>Minimum Test Time (Min:Sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.855 (L)</td>
<td>398</td>
<td>5:40</td>
</tr>
<tr>
<td>8</td>
<td>1.5120 (L)</td>
<td>298</td>
<td>7:33</td>
</tr>
<tr>
<td>10</td>
<td>2.374 (L)</td>
<td>239</td>
<td>9:27</td>
</tr>
<tr>
<td>12</td>
<td>3.419 (L)</td>
<td>199</td>
<td>11:20</td>
</tr>
<tr>
<td>15</td>
<td>5.342 (L)</td>
<td>159</td>
<td>14:10</td>
</tr>
<tr>
<td>18</td>
<td>7.693 (L)</td>
<td>133</td>
<td>17:00</td>
</tr>
<tr>
<td>21</td>
<td>10.471 (L)</td>
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</tr>
<tr>
<td>24</td>
<td>13.676 (L)</td>
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<td>22:40</td>
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<tr>
<td>27</td>
<td>17.309 (L)</td>
<td>88</td>
<td>25:30</td>
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<tr>
<td>30</td>
<td>21.569 (L)</td>
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<td>28:20</td>
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<tr>
<td>33</td>
<td>25.856 (L)</td>
<td>72</td>
<td>31:10</td>
</tr>
</tbody>
</table>

6. Lines with a 36 in. average inside diameter and larger shall be air tested at each joint. A visual inspection of the line shall be performed immediately after the test.
air test. The minimum time allowable for the pressure to drop from 3.5 psi to 2.5 psi during a joint test, regardless of pipe size, shall be 10 seconds.

(f) **Retesting.** Sanitary sewers failing to meet requirements of low pressure air test shall be tested again after the Contractor has located and remedied defects causing failure. No sanitary sewer will be accepted until the limits of test procedures are satisfied.

3. **Measurement and Payment.** This Item shall be considered subsidiary to the various bid items of the Contract and will not be paid for directly.