

SECTION 33 05 05.31

Hydrostatic Testing

PART 1: GENERAL

1.1 SCOPE OF WORK

- A. Test all piping, valves, manholes and appurtenances installed under this Contract. Testing shall be performed concurrent with installation. Do not install more than 1,000 feet of pipe without being tested, unless approved by Owner.

1.2 SUBMITTALS

- A. Prepare and submit schedules and procedures to Owner for testing of all parts of the sewer main installed in accordance with this Contract. Submit the schedule at least seven days prior to any testing.

PART 2: PRODUCTS

2.1 EQUIPMENT

- A. Furnish the pump, pipe connections, and all necessary apparatus for the pressure and leakage tests including gauges and metering devices. Owner reserves the option to furnish the gauges and metering devices for the tests. Excavate, backfill, and furnish all necessary assistance for conducting the tests.

PART 3 EXECUTION

3.1 GENERAL

- A. LEAKAGE: All sewers shall be tested for excessive leakage.
 - 1 Hydrostatic Testing for Gravity Systems
 - a. Test to be conducted in conformance with the procedures described in ASTM C969-17
 - b. The leakage outward or inward (exfiltration or infiltration) shall not exceed fifty (50) gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of 2 feet and shall be ran for no less than two (2) hours after stabilization of temperature.
 - 2 Hydrostatic Tests for Pressure Systems
 - a. Conformance Procedure: Perform hydrostatic pressure and leakage tests. Conform to AWWA C 600 procedures as modified herein. Tests shall apply to all pressure sewers.
 - b. Sectionalizing: Test in segments between sectionalizing valves, between a sectionalizing valve and a test plug, or between test plugs. Contractor shall furnish and install test plugs at no additional cost to the Owner, including all anchors, braces, and other devices to withstand hydrostatic pressure on

plugs. Contractor shall be responsible for any damage to public or private property caused by failure of plugs. Limit fill rate of line to available venting capacity.

- c. Pressure Test: Conduct at 1.5 times maximum operating pressure determined by the following formula:
 $P_{pt} = (1.5) (.433) (OP-GE)$, in which
Ppt = test pressure in psi at gauge elevation
OP = operating pressure in feet as indicated for highest elevation of the hydraulic gradient on each section of the line
GE = elevation in feet at center line of gauge.
Perform pressure tests satisfactorily prior to determining leakage.
- d. Leakage Test: Conduct at the maximum operating pressure as determined by the following formula:
 $P_{lt} = 0.433 (OP-GE)$, in which
Plt = test pressure in psi at gauge elevation
OP and GE - as defined from pressure test formula (see above) All joints shall be watertight and free from leaks

B. DEFLECTION: Not less than 30 days after completion of the backfill, a deflection test shall be performed for all flexible and semi-rigid pipes. If any section fails the test for excessive deflection, the contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner and re-test. Deflection tests shall be conducted using a go/no-go mandrel of at least nine (9) or more odd number fins. The mandrel's outside dimension shall be sized to permit no more than 5 percent deflection. The percent deflection shall be established from the base inside diameter of the pipe. The mandrel shall be approved by the Owner prior to use. Lines that permit safe entry may allow other deflection test options, such as direct measurements with extension rulers.

C. Should any test disclose damaged or defective materials or leakage greater than that permitted, the Contractor shall, at the Contractor's expense, locate and repair and/or replace the damaged or defective materials. Materials used for repair must be approved by Owner and meet the relevant specifications. Repeat the tests until the leakage is within the permitted allowance and is satisfactory to MAWC.

END OF SECTION 33 05 05.31