

**ROGERS WATER UTILITIES SEWER SYSTEM
ROGERS, ARKANSAS**

**SPECIFICATIONS FOR SANITARY SEWER
FORCE MAIN HYDROSTATIC TEST
REVISED APRIL 2006**

1. **SCOPE**

This specification governs the testing of sanitary sewer force mains by the hydrostatic test method.

2. **GENERAL REQUIREMENTS**

- a. Sanitary sewer force main(s) shall be hydrostatic tested for leaks upon the completion of the backfill and compaction operation.
- b. The hydrostatic test method shall be in accordance with ANSI/AWWA C605-94 for PVC main(s) and ANSI/AWWA C600-99 for ductile iron main(s), except as specified otherwise herein.
- c. All sanitary sewer force main(s) shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pump(s) or 150 pounds per square inch (psi), which ever is greater. The pressure measurement shall be made from the lowest elevation of the sanitary sewer force main section being tested. The test pressure shall not exceed the pipe or valve rated pressures.
- d. The hydrostatic test duration of each sanitary sewer force main test section is 2 hours (uninterrupted).
- e. The maximum allowable leakage of sanitary sewer force main(s) shall be based upon the following formulas:

PVC Pipe

$$L = \frac{SDP^{1/2}}{148,000}$$

Ductile Iron Pipe

$$L = \frac{SDP^{1/2}}{133,200}$$

SANITARY SEWER FORCE MAIN HYDROSTATIC TEST
08-06 SPECIFICATIONS

Where:

L = Allowable leakage(makeup water) in gallons per hour (GPH)

S = Length of pipe tested in feet

D = Nominal diameter of pipe in inches

P = Average test pressure maintained during leakage test in psi

- f. The Contractor shall remove all debris, soil and rocks from the sanitary sewer force main(s) prior to the hydrostatic test.
- g. The Contractor shall provide the water for the hydrostatic test and shall be responsible for hauling water. If water is to be used from a fire hydrant, the Contractor shall familiarize himself with the RWU's services fire hydrant meter rental rules and regulations. The existing water system shall be protected from cross-connection.
- h. The Contractor shall furnish all equipment and labor required, including necessary piping/hoses, injection booster pump, test pressure gauge, water source for testing the sanitary sewer force main(s) with a measuring meter and stopwatch. The measuring meter dial shall be in 0.10 gallons increments. The test pressure gauge shall have a minimum range of 0-300 psi and the pressure gauge figure intervals shall be a maximum of 5 psi increments.
- i. The Contractor shall install a test corporation at the location determined by the Engineer and RWU personnel. The Contractor shall be responsible for any holes excavated and/or left open for hydrostatic testing purposes.
- j. The hydrostatic test shall be performed by the Contractor and witnessed by the Engineer and RWU personnel. The Engineer shall furnish hydrostatic test reports of sanitary sewer force main(s) to the Contractor and RWU.
- k. The cost of the hydrostatic test including test corporation, filling water and the hydrostatic test is incidental to the cost of the project.

3. **TEST PROCEDURES**

- a. After the sanitary sewer force main(s) has been laid and backfilled as specified, the Contractor shall slowly fill the sanitary sewer force main with water and remove/expel all air from the section of force main being tested.
- b. After the section of force main being tested has been filled with water, the test section shall be allowed to stand under static pressure for 24 hours prior to the hydrostatic test.

- c. The Contractor shall hydrostatic test (pre-test) the test section at the specified test pressure. The pre-test shall continue until the Contractor has satisfied himself that the test section will pass the hydrostatic test.
- d. Once the test section has been pre-tested, the specified test pressure shall be supplied by means of the injection booster pump and the Engineer must record the initial pressure reading. After the 2 hour test period, the Engineer must record the ending pressure reading. RWU personnel must witness the pressure readings.
- e. After the 2 hour test period, the computed allowable leakage volume (measured by the test water meter) must be injected into the force main test section by means of the injection booster pump. After the allowable leakage volume is added into the force main test section, the Engineer must record the final pressure reading. If the final pressure reading is less than the initial pressure reading, the force main test section has *failed the hydrostatic test*. If the final pressure reading is equal too or greater than the initial pressure reading, the force main test section has *passed the hydrostatic test*. RWU personnel must witness the pressure readings and leakage volume added.
- f. After *passing the hydrostatic test*, remove the pneumatic plugs (test bulkheads) and/or open the line valves of the force main test section.

5. **FAILURE OF HYDROSTATIC TEST**

Any sanitary sewer force main that has visible leaks or fails the hydrostatic test must be repaired. Upon completion of the repairs and the backfill/compaction operation, the sanitary sewer force main shall be retested as described in the above test procedures. The Engineer must witness the sanitary sewer force main repair and backfill operation. The cost of the repair and backfill is incidental to the cost of the project.

6. **ACCEPTANCE**

The sanitary sewer force main shall have passed the hydrostatic test if the force main test section does not exceed the allowable leakage after the 2 hour test period.

SANITARY SEWER FORCE MAIN HYDROSTATIC TEST
08-06 SPECIFICATIONS

ALLOWABLE LEAKAGE OF PVC FORCE MAINS IN GALLONS PER
HOUR (GPH) AT 150 PSI

Pipe Dia. (In.)	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	700 Ft.	800 Ft.	900 Ft.	1000 Ft.
4	0.03	0.07	0.10	0.13	0.17	0.20	0.23	0.26	0.30	0.33
6	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
8	0.07	0.13	0.20	0.26	0.33	0.40	0.46	0.53	0.60	0.66
10	0.08	0.16	0.25	0.33	0.41	0.50	0.58	0.66	0.74	0.83
12	0.10	0.20	0.30	0.40	0.50	0.60	0.69	0.79	0.89	0.99

If force main under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each pipe size.

ALLOWABLE LEAKAGE OF DIP FORCE MAINS IN GALLONS PER
HOUR (GPH) AT 150 PSI

Pipe Dia. (In.)	100 Ft.	200 Ft.	300 Ft.	400 Ft.	500 Ft.	600 Ft.	700 Ft.	800 Ft.	900 Ft.	1000 Ft.
4	0.04	0.07	0.11	0.15	0.18	0.22	0.26	0.29	0.33	0.37
6	0.06	0.11	0.17	0.22	0.28	0.33	0.39	0.44	0.50	0.55
8	0.07	0.15	0.22	0.29	0.37	0.44	0.51	0.59	0.66	0.74
10	0.09	0.18	0.28	0.37	0.46	0.55	0.64	0.74	0.83	0.92
12	0.11	0.22	0.33	0.44	0.55	0.66	0.77	0.88	0.99	1.10

If force main under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each pipe size.

Previous Specifications

April 16,1997