

9.1 Acceptance criteria: Concrete; manhole sections; test method; vacuum test.

TABLE 9-1
Minimum Test Times for Various Manhole Diameters
(seconds)

	Diameter (Inches)											
	30	33	36	42	48	54	60	66	72			
8	11	12	14	17	20	23	26	29	33			
1	14	15	18	21	25	29	33	36	41			
0												
1	17	18	21	25	30	35	39	43	49			
2												
1	20	21	25	30	35	41	46	51	57			
4												
1	22	24	29	34	40	46	52	58	67			
0												
1	25	27	32	38	45	52	59	65	73			
8												
2	28	30	35	42	50	53	65	72	81			
0												
2	31	33	39	46	55	64	72	79	89			
2												
4												
2	33	36	42	51	59	64	78	87	97			
0												
2	36	39	46	55	64	75	85	94	105			
2												
6												
2	39	42	49	59	69	81	91	101	113			
8												
3	42	45	53	63	74	87	98	108	121			
0												

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9.04 LIFT STATION AND FORCE MAIN TESTING

The following section describes the testing that shall be performed on the lift station pumps, piping and force main for acceptance and dedication to the District.

NOTE: The Contractor shall be responsible for providing sufficient notice of all lift station and force main testing to the District, 48 hours minimum, to ensure that the following personnel shall be present at the time of testing: (1) District engineering representative, (2) private inspector, (3) contractor's representative, (4) developer's representative, (5) Fall Creek Regional Waste District Lift Station Maintenance representative.

A. FORCE MAIN TESTING

1. General

Under the observation of the District's Inspector, force mains shall be tested for leakage after installation and prior to final acceptance. The Contractor shall be responsible for providing all equipment and tools necessary to perform an air pressure test or hydrostatic pressure test conducted in accordance with AWWA standards for testing pressure pipe.

*These standards are material specific and generally reference manufacturer's guidelines. The standards apply to method of conducting air pressure tests only. Established pass/fail criteria are contained in the following sub-sections.

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, PA 19103.

2. Air Pressure Testing

Force mains shall not be tested using air pressure test methods.

3. Hydrostatic Pressure Testing

Hydrostatic pressure testing of force mains is the only method of force main testing approved by the District.

The Contractor shall be responsible for providing all of the equipment and tools necessary to conduct the hydrostatic test including, but not limited to, the following:

- Hydrostatic test pump (jockey pump).

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- Four and one half (4 1/2") inch diameter calibrated pressure test gauge of range 0-150 psi graduated in 1 psi increments. The manufacturer's calibration papers and test date information shall be made available at the request of the District.

- All pipe plugs and/or caps required to perform the hydrostatic test.

- Calibrated/graduated container to measure quantity of water required to be added during hydrostatic pressure test to maintain specified test pressure.

The hydrostatic pressure test shall be conducted in accordance with the applicable AWWA standard based on force main material and in accordance with ASTM E103, "Standard Method for Hydrostatic Leak Testing," in conjunction with and in addition to the aforementioned standards, the hydrostatic pressure test shall proceed as follows:

- The force main shall be completely backfilled prior to testing.

- The influent line and effluent discharge shall be appropriately plugged/bulkheaded. The plugs/bulkheads shall be equipped with a minimum of two (2) openings for filling/drainage of the pipeline and for bleeding air from the line. Thrust blocking restraints are required at each bulkhead and shall be furnished in accordance with the bulkhead manufacturer's requirements.

- The test line shall be filled with water at a slow rate to prevent air entrapment. In the case where concrete force main materials are being tested, the line shall be left at low pressure for 24 hours prior to pressure testing in order to minimize the apparent leakage due to water absorption by the pipe walls.

- Trapped air shall be expelled through high point bleed off valves as the line is being filled.

- The test line shall be pressurized to 1.5 times the pump shut-off head as determined from the pump manufacturer's performance curves or to 100 psi whichever is greater.

- Water shall be added to the test segment to maintain the test pressure for a period of no less than 2 hours and no more than 8 hours. The District's inspector must be present for at least the first 2 hours of testing.

- If the force main or any portion thereof fails the hydrostatic pressure test, the Contractor shall remove and replace or otherwise repair the force main to the satisfaction of the District and the force main shall be retested.

B. WET WELL LEAKAGE TESTING

Leakage tests shall be made and observed by the District's Inspector in the wet well. The test shall be the exfiltration test made as described below:

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After the wet well has been assembled in place, all lifting holes shall be filled with an approved non-shrinking mortar. The test shall be made prior to placing any fill material. If the ground water table has been allowed to rise above the bottom of the wet well, it shall be lowered for the duration of the test. All pipes and other openings into the wet well shall be suitably plugged and the plugs braced to prevent blow out.

The wet well shall then be filled with water to the top. If the excavation has not been backfilled, and observation indicates no visible leakage after 1 hour, the wet well may be considered to be satisfactorily water-tight. If the test described above is unsatisfactory or if the wet well excavation has been backfilled, the test shall be continued for a period of 24 hours to allow for absorption. At the end of this period, the wet well shall be refilled to the top, if necessary, and the measuring time of at least 8 hours begun. At the end of the test period, the wet well shall be refilled to the top, measuring the volume of water added. This amount shall be extrapolated to a 24-hour rate and the leakage determined on the basis of depth. The leakage for each wet well shall not exceed 1 gallon per vertical foot for a 24-hour period. If the test fails this requirement, but the leakage does not exceed 2 gallons per vertical foot per day, repairs by approved methods may be made as directed by the District to bring the leakage within the allowable rate of 1 gallon per foot per day. Leakage due to a defective section or joint or exceeding the 2 gallon per vertical foot per day maximum shall be cause for the rejection of the wet well. It shall be the Contractor's responsibility to uncover the wet well as necessary and to disassemble, reconstruct, or replace it as directed by the District. The wet well shall then be retested.

No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorptions, etc.; i.e., it will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete. Furthermore, the Contractor shall take any steps necessary to assure the District's Inspector that the water table is below the bottom of the wet well throughout the test.

C. LIFT STATION PUMP TESTING

Lift Station pump test will be performed by the Contractor during the lift station's final inspection. The Contractor shall be responsible for providing the clean water to run the pumps and perform the test(s).

1. Manufacturer's Start-up

Prior to the District's final inspection of the lift station equipment, the Contractor shall be responsible for coordinating start-up activities with the pump manufacturer's representative in accordance with the manufacturer's requirements. The District's Inspector must be present at the time of manufacturer's start-up.

The manufacturer's representative shall complete the appropriate one of the two lift station check lists attached at the end of this Section. The checklist shall be witnessed to in writing by the District's Inspector. Any deficiencies in equipment and/or workmanship noted during the manufacturer's start-up shall be remedied by the Contractor prior to final inspection.

Upon successful completion of the manufacturer's start-up, the manufacturer shall deliver to the Contractor:

- Three-(3) copies of the completed, witnessed checklist with cover letter certifying that all pumping and electrical equipment has been installed and is operating in accordance with manufacturer's requirements;
- Five (5) sets of Operation and Maintenance Manuals as specified in Section 10 of these Standards; and
- One (1) complete set of Spare Parts as specified in Section 10 of these Standards.

2. Final Inspection

Contractor shall deliver two (2) copies of the manufacturer's start-up checklist at the time of final inspection. In addition, the Contractor shall provide the following pump test equipment and materials:

- Water to conduct test,
- Amp/volt meter,
- Stop watch,
- Tape level rod to measure settings,
- Calibrated test gauge to measure operating head. The gauge shall be calibrated in feet of water from 0 to 100 feet in one foot increments, and
- Manufacturer's pump performance curves.

The District's representative attending the final inspection shall review the manufacturer's checklist and re-check any deficiencies. The District's representatives shall then complete a cursory final inspection checklist and perform pump draw down tests which shall include the following:

- Manual check of all on-off operations, alarm and run lights;
- Determination of inflow rate (if any);
- Determination of pump capacity for each pump individually and both/all pumps simultaneously;
- Determination of pump capacity with force main full. Verification of full force main shall be determined by pressure gauge provided by Contractor. Force main shall be considered full when the line pressure stabilizes; and
- Plot performance of each pump or pump curves provided by Contractor.

Contractor shall provide all water necessary to conduct the pumping tests, and shall provide a connection for the test gauge on the blind flanged tee in the valve vault. The stem connection shall be equipped with a plug valve to close the connection after testing is complete. The connection shall be left in place and shall be suitable for use as an air bleed off.

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The pumping test results must meet or exceed the design pumping criteria approved by the District to successfully pass the final inspection. Any deficiencies noted during the final inspection shall be repaired/replaced by the Contractor to the satisfaction of the District and reinspected/retested prior to final acceptance.

9.05 CLOSED CIRCUIT TELEVISION INSPECTION

When Mandrel Test shows areas of deflection failure along the pipe or when air testing fails, the Contractor shall be required to perform a closed circuit television inspection of the sanitary sewer between manholes as follows:

- A camera equipped with a rotating lens and remote control devices to adjust the light intensity and one thousand (1,000) lineal feet of sewer cable shall be provided. The camera should be able to transmit a continuous image to the television monitor as it is being pulled through the pipe. The image shall be clear enough to enable the District representative and others viewing the monitor to easily evaluate the interior condition of the pipe. The camera shall have a digital display for lineal footage and project number and an audio voice-over shall be made during the inspection identifying any problems.
- The pipe shall be thoroughly cleaned before the camera is installed and televising is commenced.
- The VHS tape of the entire sewer line and reproduction map indicating the pipe segment numbers of all the pipe that has been televised shall be submitted to the District for their records.

If any pipe and/or joint is found to be leaking, the Contractor shall be required to repair that portion of the pipe to the satisfaction and approval of the District.

- FCRWD will perform a closed circuit television inspection of all new sanitary sewer lines prior to final acceptance by the District. Any deficiencies noted must be repaired and re-televised by the Contractor before final acceptance by the District.

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Table 9-2
(9-Arm Mandrel)
Dimensions for ASTM D3034 SDR 35 PVC Pipe

Nominal Diameter	Length	Deflection	
		3%	5%
8	8	7.71	7.56
10	10	9.63	9.45
12	12	11.46	11.26
15	12	14.03	13.78

(10-Arm Mandrel)
Dimensions for ASTM D3034 SDR 35 PVC Pipe

Nominal Diameter	Length	Deflection	
		3%	5%
8	8	7.72	7.58
10	10	9.65	9.48
12	12	11.48	11.29
15	12	14.06	13.82

EXAMPLE LOW PRESSURE AIR TESTS

A. GENERAL

The purpose of this Section is to illustrate the proper application of this recommended practice with regard to appropriate test selection. The examples that follow include a variety of conditions which may be encountered in the field.

1. EXAMPLE A

A manhole to manhole reach of nominal 12-inch pipe is 350 feet long. No lateral connections exist in the reach. What is the required test time for a 0.5 psig pressure drop?

Solution: The required test time can be read directly from Table 9.1B. For 350 feet of 12-inch pipe, the required test time is 9:58 (9 minutes and 58 Seconds).

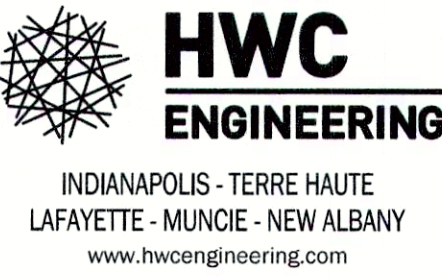
2. EXAMPLE B

A 350 foot section of nominal 12-inch pipe is ready for testing. A total of 128 feet of 4-inch lateral sewer pipe is connected to the 350 foot section and will be included in the test. What will be the required test time for a 0.5 psig pressure drop?

CONTRACTOR
SHALL ADHERE
AND REFERENCE
THE CURRENT FALL
CREEK REGIONAL
WASTE DISTRICT
STANDARDS FOR
DESIGN AND
CONSTRUCTION OF
SANITARY SEWERS.

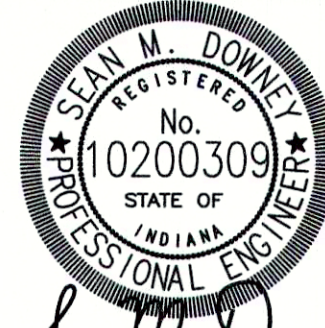
REVISIONS

DATE	DESCRIPTION	BY
03/23/18	REVISED PER FCRRWD REVIEW COMMENTS	DC



MAPLE TRAILS SECTION 1

SANITARY SPECIFICATIONS



DRAWN BY
SMD
CHECKED BY
SMD
DATE
FEBRUARY 12, 2018
SCALE
N/A
SHEET

C8.7
SANITARY SPECIFICATIONS