

## **SECTION 33 08 00 COMMISSIONING OF WATER UTILITIES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Testing requirements for potable and non-potable water piping systems.
- B. Warning: DO NOT use hydrostatic pressures described in this section for air-pressure testing.

#### **1.2 DEFINITIONS**

- A. Leakage: The quantity of water required to maintain the specified hydrostatic test pressure after the pipeline has been filled with water and the air expelled.
- B. Non-rigid Pipe: Any pipe that requires Bedding and backfill material for structural support.

#### **1.3 SUBMITTALS**

- A. Pipeline Test Report: Submit.
  - 1. Type of test.
  - 2. Identification of pipe system.
  - 3. Size, type, location and length of pipe in test section.
  - 4. Test pressure and time.
  - 5. Video cassette and log of visual examination.
  - 6. Amount of Leakage versus allowable.
  - 7. Date of test approval.
  - 8. Signature of test supervisor.
  - 9. Signature of Resident Project Representative witnessing and accepting the test.

#### **1.4 PROJECT CONDITIONS**

- A. Repair pipeline system at no additional cost to OWNER until it passes specified commissioning tests.

#### **1.5 WARRANTY**

- A. At the end of the One Year Correction Period repeat any test requested by ENGINEER to verify warranty of pipeline performance.

### **PART 2 PRODUCTS**

#### **2.1 TESTING MATERIALS**

- A. Medium: Water, air.
- B. Recording Equipment (pressure systems):
  - 1. Supply all equipment and power to perform pressure testing.
  - 2. Secure approval of pressure gages.

3. Locate all gages and recording equipment away from affect of sunshine or unsuitable weather conditions.
4. Place, vents, pressure taps and drains for the test. Repair pipeline at completion of test at no additional cost to OWNER.

## **PART 3 EXECUTION**

### **3.1 PREPARATION**

- A. Notify ENGINEER 48 hours in advance of test.
- B. Carry out tests as pipeline construction progresses to ensure construction methods are producing satisfactory results.
- C. Remove debris, sediment and other material from installed pipe prior to testing. Do not discharge or flush sand, gravel, concrete, debris or other foreign material into any existing pipeline system. Flushing with clean water only will be allowed but with minimal flows to eliminate exceeding capacities of the existing gravity systems. Flushing into existing pressurized water systems will not be allowed.

### **3.2 ALIGNMENT AND GRADE TEST**

- A. Do not allow line and grade of pipe to vary more than 1/2 inch in 10 feet and not more than 1 inch variance from true line at any location.
- B. Do not allow grade of pipe to vary more than 1/4 inch in 10 feet for all design grades less than or equal to 1 percent and not more than 1/2 inch total variance from true grade at any location. Also, do not allow grade of pipe to vary more than 1/2 inch in 10 feet for all design grades greater than 1 percent and not more than 1 inch total variance from true grade at any location. These tolerances shall be acceptable provided that such variation does not result in a level or reverse sloping invert.
- C. The variation in the invert elevation between adjoining ends of pipe due to eccentricity of joining surface and pipe interior surfaces shall not exceed 1/64 inch per inch of pipe diameter, or 1/4 inch maximum.

### **3.3 PRESSURE TEST**

- A. Air Test: Per pipe manufacturer's recommendation.
- B. Hydrostatic test:
  1. Provide 225 psi test pressure for 2 hours unless specified otherwise.
  2. Provide air release taps at pipeline's highest elevations and expel all air before the test. Insert permanent plugs after test has been completed.
  3. No piping installation will be acceptable until the leakage is less than the amount allowed by industry standards for the type of pipe material being tested or if no standard prevails than the number of gallons per hour as determined by the formula:

$$Q = (LD \times \text{Square root of } P) \div 133,200$$

Where

Q = allowable leakage, in gallons per hour.

L = length of pipe under test in feet.

D = nominal diameter of pipe in inches.

P = average test pressure, in pounds per square inch (gage).

- C. Locate and repair defective joints and retest until the leakage rate is less than allowable.
- D. Repair any noticeable leakage even if total leakage is less than allowable.

### 3.4 OBSTRUCTION AND DEFLECTION TEST

A. Obstructions: Maximum protuberance is 1 inch.

B. Deflections:

- 1. Do not use mechanical pulling equipment when pulling mandrels through pipe.
- 2. Maximum reduction of internal diameter in any plane measured full length of installation and not less than 30 days after installation as follows:
  - a. Polyvinyl chloride pipe, 7.5 percent.
  - b. High density polyethylene pipe, 5 percent.
  - c. Ductile iron pipe, 3 percent.
  - d. Corrugated metal pipe, 7.5 percent.
- 3. Recommend an alternate method of measurement if mandrel testing would cause damage to internal pipe coating.

### 3.5 INFILTRATION TEST

A. Maximum is 50 gallons per inch diameter per mile per 24 hours.

### 3.6 PIPE TESTING SCHEDULE

A. Irrigation -Gravity System:

- 1. Grade test: All circuits drain.

B. Irrigation – Pressure System:

- 1. Grade test: All circuits drain.

- 2. Pressure test.

- 3. Operational Testing:

- a. Perform operational testing after hydrostatic test is complete; backfill is in place and sprinkler heads adjusted to final coverage.
- b. Demonstrate system meets coverage requirements and automatic controls function properly.
- c. Coverage requirements are based on operation of 1 circuit at a time.

C. Sanitary Sewers:

- 1. Alignment and grade test.
- 2. Obstructions and deflection test.
- 3. Infiltration test for gravity pipeline systems.
- 4. Pressure test for pressure pipeline systems.
- 5. Video inspection.

D. Subdrains:

1. Grade test: All pipelines drain.
2. Obstructions and deflection test.

E. Storm Drains:

1. Alignment and grade test.
2. Obstructions and deflection test.
3. Infiltration test for gravity pipeline systems.
4. Pressure test for pressure pipeline systems.
5. Video inspection.

F. Potable Water System:

1. Obstruction and deflection test.
2. Pressure test.
3. Disinfection (Section 33 13 00).

END OF SECTION