# GEneral

## Related Sections

#### Section 01300 – Submittals

#### Section 01351 – Health and Safety

#### Section 01810 - Equipment Testing and Facility Commissioning

## Submittals

### Informational Submittals, in accordance with Section 01300 - Submittals:

#### Testing Plan: Submit prior to testing and include the following information at a minimum.

##### Safety Plan, approved by Consultant.

##### Testing dates.

##### Piping systems and section(s) to be tested.

##### Test type.

##### Method of isolation.

##### Calculation of maximum allowable leakage for piping section(s) to be tested.

#### Certifications of Calibration: Testing equipment.

#### Certified Test Report.

## Measurement and Payment

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

# PRODUCTS (NOT USED)

# EXECUTION

## Preparation

### Notify the Consultant in writing a minimum of 5 Days in advance of testing. Perform testing in the presence of the Consultant.

### Pressure Piping:

#### Install temporary thrust blocking or other restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.

#### Wait a minimum of 28 Days after concrete thrust blocking is installed to perform pressure tests.

#### Prior to testing, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.

#### New Piping Connected to Existing Piping:

##### Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to the Consultant.

##### Test joints between new piping and existing piping by methods that do not place the entire existing system under test load, as approved by the Consultant.

#### Items that do not require testing include: tank overflows to atmospheric vented drains, tank atmospheric vents

#### Test Pressure: As indicated on the Piping Schedule

### Test section may be filled with water and allowed to stand under low pressure prior to testing.

### Gravity Piping:

#### Perform testing after service connections, manholes, and backfilling have been completed between stations to be tested.

#### Determine groundwater level at time of testing by exploratory holes or other method acceptable to the Consultant

## Hydrostatic Test for Pressure Piping

### Fluid: Clean water of such quality to prevent corrosion of materials in the piping system.

### Exposed Piping:

#### Perform testing on installed piping prior to application of insulation.

#### Maximum Filling Velocity: 0.076 metres per second, applied over full area of pipe.

#### Vent piping during filling. Open vents at high points of piping system or loosen flanges, using at least four bolts, or use equipment vents to purge air pockets.

#### Maintain hydrostatic test pressure continuously for a minimum of 60 minutes, and for such additional time as necessary to conduct examinations for leakage.

#### Examine all joints and connections for leakage.

#### Correct all visible leakage and retest as specified herein.

#### Leave pipe full of water after repair of leaks

### Buried Piping:

#### Test after backfilling has been completed.

#### Expel air from piping system during filling.

#### Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.

#### Maintain hydrostatic test pressure continuously for a minimum of 2hours, reopening the isolation valve only as necessary to restore test pressure.

#### Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for the duration of the test.

#### Maximum Allowable Leakage:

where:

*Qm* = Allowable leakage, in litres per hour.  
L = Length of pipe section being tested, in metres.  
D = Nominal diameter of pipe, in millimetres.  
P = Average test pressure during leakage test, in kilopascals.

#### Correct leakage greater than allowable, and re-test as specified above.

## Hydrostatic Test for Gravity Piping

### Testing Equipment Accuracy: Plus or minus 1.9 litre water leakage under the specified conditions.

### Maximum Allowable Leakage: 0.078 litre per hour per millimeter diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.

### Gravity Sanitary and Roof Drain Piping: Test with 4.6 m of water to include highest horizontal vent in filled piping. Where vertical drain and vent systems exceed 4.6 m in height, test systems in 4.6 m vertical sections as piping is installed.

### Exfiltration Test:

#### Hydrostatic Head:

##### A minimum of 1.8 metre(s) above maximum estimated groundwater level in section being tested.

##### A maximum of 1.8 metre(s) above inside the top of highest section of pipe in test section, including service connections.

#### Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 9.1 m of water column.

### Infiltration Test:

#### Groundwater Level: At least 1.8 meter above inside top of highest section of pipe in test section, including service connections.

### Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if the pipe previously passed a pressure test.

### Defective Piping Sections: test and seal individual joints, and retest as specified above.

## Field Quality Control

### Pipe leakage testing shall be performed and be approved prior to the start of any commissioning activities. Commissioning activities shall be performed in accordance with Section 01810 - Equipment Testing and Facility Commissioning.

### Test Report Documentation shall include, but not be limited to, the following:

#### Test date.

#### Description and identification of piping tested.

#### Test fluid.

#### Test pressure.

#### Remarks, including:

##### Leaks (type, location).

##### Repair/replacement performed to remedy excessive leakage.

#### Signatures of the Contractor and the Consultant to represent that the test has been satisfactorily completed.

**END OF SECTION**