PRESSURE TESTING WATER SERVICE LINES AND MAINS

Test Pressure

Test pressure may be limited by valves, or other devices, or lower pressure rated components. Such components may not be able to withstand the required test pressure, and should be either removed from, or isolated from, the section being tested to avoid possible damage to, or failure of, these devices. Isolated equipment should be vented.

- For continuous pressure systems where test pressure limiting components or devices have been isolated, or removed, or are not present in the test section, the maximum allowable test pressure is 1.5 times the system design pressure at the lowest elevation in the section under test.
- If the test pressure limiting device or component cannot be removed or isolated, then the limiting section or system test pressure is the maximum allowable test pressure for that device or component.
- For non-pressure, low pressure or gravity flow systems, consult the piping manufacturer for the maximum allowable test pressure.

Test Duration

For any test pressure from 1.0 to 1.5 times the system design pressure, the total test time including initial pressurization, initial expansion, and time at test pressure, must not exceed eight (8) hours. If the pressure test is not completed due to leakage, equipment failure, etc., the test section should be de-pressurized, and allowed to "relax" for at least eight (8) hours before bringing the test section up to test pressure again.

Pre-Test Inspection

Test equipment and the pipeline should be examined before pressure is applied to ensure that connections are tight, necessary restraints are in-place and secure, and components that should be isolated or disconnected are isolated or disconnected. All low pressure filling lines and other items not subject to the test pressure should be disconnected or isolated.

Hydrostatic Testing

Hydrostatic pressure testing is preferred and is strongly recommended. The preferred testing medium is clean water. The test section should be completely filled with the test medium, taking care to bleed off any trapped air. Venting at high points may be required to purge air pockets while the test section is filling. Venting may be provided by loosening flanges, or by using equipment vents. Re-tighten any loosened flanges before applying test pressure.

Monitored Make-up Water Test

The test procedure consists of initial expansion, and test phases. During the initial expansion phase, the test section is pressurized to the test pressure, and sufficient make-up water is added each hour for three (3) hours to return to test pressure.(1 After the initial expansion phase, about four (4) hours after pressurization, the test phase begins. The test phase may be one (1), two (2), or three (3) hours, after which a measured amount of make-up water is added to return to test pressure. If the amount of make-up water added does not exceed Table 3 values, leakage is not indicated. *See Table below for Make Water Volumes.*

Non-Monitored Make-Up Water Test

The test procedure consists of initial expansion, and test phases. For the initial expansion phase, make-up water is added as required to maintain the test pressure for four (4) hours. For the test phase, the test pressure is reduced by 10 psi. If the pressure remains steady (within 5% of the target value) for an hour, no leakage is indicated.

Pneumatic Testing

WARNING: Compressed air or any pressurized gas used as a test medium may present severe hazards to personnel in the vicinity of lines being tested. Extra personnel protection precautions should be observed when a gas under pressure is used as the test medium.

WARNING: Explosive Failure - Piping system rupture during pneumatic pressure testing may result in the explosive, uncontrolled movement of system piping, or components, or parts of components. Keep personnel a safe distance away from the test section during testing.

Pneumatic testing should not be used unless the Owner and the responsible Project Engineer specify pneumatic testing or approve its use as an alternative to hydrostatic testing.

Pneumatic testing (testing with a gas under pressure) should not be considered unless one of the following conditions exists:

- When the piping system is so designed that it cannot be filled with a liquid; or
- Where the piping system service cannot tolerate traces of liquid testing medium.

The testing medium should be non-flammable and non-toxic. The test pressure should not exceed the maximum allowable test pressure for any non-isolated component in the test section.

Leaks may be detected using mild soap solutions (strong detergent solutions should be avoided), or other non-deleterious leak detecting fluids applied to the joint. Bubbles indicate leakage. After leak testing, all soap solutions or leak detecting fluids should be rinsed off the system with clean water.

High Pressure Procedure

For continuous pressure rated pipe systems, the pressure in the test section should be gradually increased to not more than one-half of the test pressure, then increased in small increments until the required test pressure is reached. Test pressure should be maintained for ten (10) to sixty (60) minutes, then reduced to the design pressure rating, and maintained for such time as required to examine the system for leaks.

Low Pressure Procedure

For components rated for low pressure service, the specified rated test pressure should be maintained for ten (10) minutes to one (1) hour, but not more than one (1) hour. **Test pressure ratings must not be exceeded.**

Leakage inspections may be performed during this time. If the test pressure remains steady (within 5% of the target value) for the one (1) hour test time, no leakage is indicated.

Pressure testing of gravity-flow sewer lines should be conducted in accordance with ASTM F1417, Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.

Nominal Pipe Size, in	Make-Up Water Allowance (U.S. Gallons per 100 ft of Pipe)		
	1 Hour Test	2 Hour Test	3 Hour Test
1-14	0.06	0.10	0.16
1-1/2	0.07	0.10	0.17
2	0.07	0.11	0.19
3	0.10	0.15	0.25
4	0.13	0.25	0.40
5	0.19	0.38	0.58
6	0.3	0.6	0.9
8	0.5	1.0	1.5
10	0.8	1.3	2.1
12	1.1	2.3	3.4