HYDROSTATIC LEAK TEST PROCEDURE

Standard Operating Procedure
Customer Name – City, State
Project Location

Approved for Submittal:	Quality Control Manager	Date

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1.0 Scope

1.1 This procedure establishes a method to perform hydrostatic testing of piping systems and to meet the hydrostatic leak test requirements of ASME B31.3 and B31.1.

2.0 Responsibility

2.1 The Project Superintendent is responsible for ensuring that field personnel are trained in this procedure and that all aspects of this procedure are adhered to.

2.2 Kinetics Company field personnel are responsible for performing this procedure.

2.3 The Quality Control Representative will monitor testing and prepare test packages to document the test results.

2.4 The Quality Assurance Manager shall ensure that this procedure meets the needs of the contract specifications and will ensure that the Quality Control Representative has been trained to the requirements of this procedure.

3.0 Documentation

3.1 The hydrostatic test report will contain the following information:

3.1.1 Job name and number

3.1.2 The system or line tested

3.1.3 A test description of what was tested and location points

3.1.4 Test duration and medium used

3.1.5 Test gauge identification and calibration date

3.1.6 Test starting date, time, temperature, and pressure

3.1.7 Test completion date, time, temperature, and pressure

3.1.8 Test results (Pass or Fail)

3.1.9 Comments or any additional information

3.1.10 Signatures of essential personnel involved with the test

4.0 Equipment and Tools

4.1 A hydrostatic test pump or source capable of producing 125% of test pressure.

4.2 A separate test pump is not required if the test pressure is lower than the fill source pressure (i.e. city water pressure).

4.3 Test & Fill Manifold

4.3.1 Construct the test assembly using materials compatible with the system. The test manifold will include the following items:

(a) The connection to the system to be tested;

(b) A minimum of one calibrated pressure gauge;

(c) An isolation valve with a disconnect to the pressure source;

(d) An isolation valve with a disconnect to the fill source.

4.3.2 Optionally, a pressure relief valve set a 110% of test pressure may be included for the following situations:

(a) Tests where the chance of an increase in pressure due to thermal expansion of the test medium exists;

(b) Tests with pressures are within 50 psig of the lowest rated component in the system or when specified by the design engineer.

5.0 Procedure

5.1 Test Package

5.1.1 Fill out and sign the Test Report. Ensure that the information covered in Section 3.0 is complete.

5.1.2 Optionally, a test diagram may be prepared by marking a P&ID drawing to show the following:

(a) Indicate the location of all test blinds;

(b) Indicate where jumpers are required;

(c) Note all valves that will be closed or open;

(d) Indicate the method of determining if leakage occurs across valve seats;

(e) Indicate all components to be removed from the test;

(f) Indicate all components that are changed for the test.

5.1.3 Submit the Test Report to the Inspector for review prior to setting up the test.

5.2 Prior to testing, confirm that the section to be tested is mechanically complete by verifying that:

5.2.1 all welding has been complete;

5.2.2 the piping has sufficient support to maintain grade and support the weight of the tubing and test medium;

5.2.3 all joints are not insulated and exposed to view;

5.2.4 the system has been checked against the P&ID's and has been punched by the owner's inspector.

5.3 Preparing the system for testing

5.3.1 Remove all components that may be damaged by the test pressure or possible over pressurization. The project engineer or design engineer should determine which components meet these criteria. Special consideration should be given to components such as:

(a) Pressure Gauges

(b) Regulators, and relief Valves

(c) Pressure Transmitters

(d) Rupture Disks

5.3.2 Set all control valves in the open position or remove from the test.

5.3.3 Make sure that check valve will allow test media and pressure to pass to the entire system. This may be performed as follows:

(a) Bypass the valve

(b) Remove or block the check assembly

(c) Remove the valve from the test

5.3.4 Set ball valves in ½ open position to pressurize the cavity behind valve seats.

5.3.5 Isolate all equipment not included in the test using components compatible with the test pressure, test medium and material.

(a) Use sheet gaskets to isolate stainless steel from carbon steel blinds.

(b) Clearly mark any fittings used in the test that are not part of the permanent system.

5.3.6 Secure warning tags on all boundary valves or components indicating the individual responsible for the test.

5.4 Test set up

5.4.1 A preliminary pneumatic test may be utilized to confirm the systems closure prior to filling a system with water. This method may be useful in a sensitive environment where leaking test fluids could cause damage to equipment or contaminate an area. This test should not be performed on plastic piping systems. This test may be conducted as follows:

(a) Introduce air into the system slowly.

(b) Walk the system down and listen for blowing air or whistling.

(c) If a leak is detected, correct it after blocking off the air source.

(d) Repeat these steps until the air pressure holds at 25 psig for ten minutes.

5.4.2 Only use the specified type of testing media for a particular system. Use chlorine-free water (<25 ppm) for testing systems composed of stainless steel.

5.4.3 Test & fill manifolds will be located at the low point of the system. If the manifold is not at the low point, the gauge pressure reading will be adjusted by deducting the static head pressure to correct for the elevation difference.

5.5 System pretest.

5.5.1 Remove the air from the system.

(a) Open the high-point vents and flush until there is no evidence of entrapped air.

(b) For systems with no or few high point vents, flush branches and mains with water for a minimum of ten minutes at high flow rates in order to drive air from the system.

5.5.2 Put 25% of the test pressure on the system using the test pump or water source.

5.5.3 After the system and test medium have reached thermal equilibrium, bring the system up to test pressure in increments using the test pump.

5.5.4 Upon reaching a steady test pressure, visually examine all joints for leaks.

5.5.5 Repair leaks where necessary.

(a) If a leak is detected in a mechanical joint, do not attempt to adjust or tighten that joint while the system is under pressure.

(b) Do not over-tighten mechanical or flanged joints, leaks are often an indication of misalignment, deformed gasket, or galled or dented flange face or fitting.

(c) To correct a problem found in either (a) or (b), bleed the pressure off of the system and then perform the corrective action. Once this has been accomplished, retest the system to the original requirements

5.5.6 Hold the test pressure for a minimum of ten minutes and closely monitor the system for a pressure loss. If the pressure holds, notify the Quality Control Representative that the test is ready to begin. The Quality Control Representative will notify the Inspector.

5.6 Testing

5.6.1 With the approval of the Quality Control Representative and the Inspector, isolate the system from the test apparatus and disconnect the test pump during the pressure-hold period.

5.6.2 Note the start time, pressure, and temperature on the test report. If there is a possibility that fluid expansion might exceed the maximum allowed pressure for the test, precautions shall be taken to prevent damage to equipment and hazards to personnel.

5.6.3 The Quality Control Representative and if required, the Inspector, will examine the system while under test as required by the contract specifications.

5.6.4 Upon completion of the examination and the minimum hold period, the Quality Control Representative will log the time, pressure, temperature and results of the test on the test form. The Inspector and the Quality Control Representative will sign the test form.

5.6.5 Carefully, remove the test pressure.

5.6.6 Reinstall any components removed prior to testing and remove any temporary test connections or plugs. It may be advantageous to delay this last step until after cleaning or chemical treatment of the system is completed (if required).

5.7 When required, the Quality Control Representative and the Inspector will complete a test, clean, and closure report upon the completion of all testing, cleaning, or chemical treatment and the piping system has been restored to operational status.

6.0 Acceptance Criteria

6.1 The test pressure, duration, and media will be as specified within the contract documents.

6.2 While under test, the piping system shall not exhibit any detectable leakage for a period specified within the contract documents or as a minimum, the time it takes to visually examine all of the joints in the system. In no case, shall the test be less than 10 minutes.

7.0 Review and Retention

7.1 The Quality Assurance Committee shall review this procedure annually.