

## TESTING AND INSPECTION

Once the roughing-in is completed on a cast iron piping project, it is important to test and inspect all piping for leaks. The installer usually is required to notify the plumbing inspector or the administrative authority having jurisdiction over plumbing work before the test is made. Concealed work should remain uncovered until the required tests are made and approved. When testing, the system should be properly restrained at all bends, changes of direction, and the end of runs.

There are various types of test procedures used for the installed cast iron soil pipe and fittings. They are water or hydrostatic, air and smoke. Proper safety procedures and protective equipment should be employed during all testing procedures.

Installers should always consider local conditions, codes, manufacturer installation instructions, and architect/engineer instructions in any installation.

### Water Test

A water or hydrostatic test is the most common test used to inspect a completed cast iron soil pipe installation. This is the recommended test in most plumbing codes. The purpose of the test is to locate any leaks at the joints and correct these prior to the closing in of the piping or backfilling of the underground piping. To isolate each floor or section being tested, test plugs are inserted through test tees in the stacks. All other openings should be plugged or capped with test plugs or test caps. Prior to the beginning of the test, all bends, changes of direction and ends of runs should be properly restrained. During the test, thrust forces are exerted at these locations. Thrust is equal to the hydrostatic pressure multiplied by area. Thrust pressure, if not restrained, will result in joint movement or separation causing failure of the test.

Prior to testing, cap or plug all openings in the lower section of the section to be tested. Fill the system to be tested with water at the highest point. As water fills a vertical cylinder or a vertical pipe it creates hydrostatic pressure. The pressure increases as the height of the water in the vertical pipe increases.

Bibby recommends 10 feet of hydrostatic pressure (4.3 pounds per square inch.). Filling the system slowly should allow any air in the system to escape as the water rises in the vertical pipe. All air entrapped in the system should be expelled prior to beginning of the test. Failure to remove entrapped air may give faulty test results.

Once the stack is filled to ten feet of head, a visual inspection of the section being tested should be made to find any leaks. Where leaks are found in a hubless system in most cases hubless couplings have not been torqued as per the instructions on page 12 and 17. Proper torquing will probably correct the problem. If the leaks occur during testing of hub and spigot materials the joints should be disassembled and checked for proper installation.

Fifteen minutes is suitable time for the water test. Once the system has been successfully tested it should be drained and the next section should be prepared for testing.



## Smoke Test

When a smoke test is required by engineers, architects, or plumbing codes, it is applied to all the parts of the drainage and venting system after all fixtures have been permanently connected and all traps filled with water. A thick, penetrating smoke produced by one or more smoke machines is introduced into the system through a suitable opening.

**DANGER:** Chemical mixtures for producing smoke may be dangerous and should not be used.

As the smoke appears at the stack opening on the roof, the opening is closed off and the introduction of smoke is continued until a pressure equal to one inch of water is built up and maintained for fifteen minutes without the addition of more smoke. Under this pressure smoke should not be visible at any point, connection or fixture. All windows in the building should be closed until the test is completed.

## Air Test

Air tests are sometimes used instead of water or hydrostatic tests of completed installations. Cast iron soil pipe and fittings joined with rubber compression joints or hubless mechanical couplings are expected to have a reduction in air pressure during a 15 minute test. This drop in air pressure does not indicate a failure of the system or an indication the system will leak water. Because molecules of air are much smaller than water molecules a cast iron system is expected to have a reduction in air pressure during a 15 minute test period.

**NOTE: ADHESIVE LUBRICANTS MUST BE USED ON ALL COUPLING JOINTS DURING INSTALLATION IF AN AIR TEST WILL BE PERFORMED.**

## Test Procedures

Prior to performing the air test all threaded openings shall be sealed with a manufacturers recommended sealant, all additional openings should be sealed using test plugs recommended for use in performing air testing.

The system shall be pressurized to 35 kPa (5.1 p.s.i.) utilizing a gauge graduated to not more than 3 times the test pressure. The gauge shall be monitored during a 15 minute test period. A reduction of more than 7 kPa (1 p.s.i.) during the test period indicates failure of the test. Upon completion of the test, depressurize the system and remove the test plugs.

**NOTE: BIBBY DOES NOT RECOMMEND AIR TESTING.**

## CAUTION

MATERIAL UNDER PRESSURE CAN EXPLODE CAUSING SERIOUS PERSONAL INJURY OR DEATH. EXTREME CARE SHOULD BE EXERCISED IN CONDUCTING ANY AIR TEST. PERSONS CONDUCTING AN AIR TEST MUST EXERCISE CARE TO AVOID APPLICATION OF PRESSURE ABOVE 35 kPa (5.1 p.s.i.) TO THE SYSTEM UNDER TEST BY USING APPROPRIATE PRESSURE REGULATION AND RELIEF DEVICES. PERSONS CONDUCTING THE TEST ARE CAUTIONED TO INSPECT FOR TIGHTNESS OF ALL SYSTEM COMPONENTS PRIOR TO BEGINNING THE TEST AND AVOID ADJUSTMENT TO THE SYSTEM WHILE UNDER PRESSURE. PROPER PROTECTIVE EQUIPMENT SHOULD BE WORN BY INDIVIDUALS IN AN AREA WHERE AN AIR TEST IS BEING CONDUCTED.

