

INSTALLATION**TB-12**

September 1997

AIR TESTING OF DWV PIPE**INTRODUCTION**

The typical acceptance test for DWV pipe is water testing at ten feet of head (4.6 psi). For convenience, compressed air is often substituted for water. (The air test is actually more severe than the water test because air molecules are smaller than water molecules.)

This bulletin gives PWPipe's recommendations for testing of DWV pipe when low-pressure air is used.

Low-pressure air has been in widespread use in PVC pipe systems for almost twenty years. The information in this bulletin is based on standard practice developed many years ago for testing sewer pipe.

Reference: Uni-Bell PVC Pipe Association -- Standard Uni-B-6 "Recommended Practice for Low- Pressure Air Testing of Installed Sewer Pipe".

WARNING: Do not use air pressures higher than 9 psi. Use of compressed air higher than 9 psi may create unsafe conditions.

SAFETY

Air testing is inherently more dangerous than water testing, since air is highly compressible and expands quickly when pressure is released. If high air pressure is used, this expansion can be violent. For this reason, PWPipe recommends that the maximum air pressure not exceed 9 psi.

To ensure safety, it is very important that the following steps be taken:

PLUGS: All plugs shall be installed such that blowouts are prevented. During the test process, the contractor shall ensure that there are no hazards to person or property if a blowout does occur.

RELIEF VALVE: All pressurizing equipment used for testing shall include a regulator or relief valve set no higher than 9 psi to avoid over-pressurizing.

WARNING: Even at test pressures of 9 psi or less, exercise caution to prevent impact loads from occurring. Where impact loads may occur, wear protective equipment to prevent injury.

EQUIPMENT

PLUGS: Either mechanical or solvent-cemented plugs may be used. All plugs shall be designed to resist internal testing pressures without external support.

CONTROL EQUIPMENT: Air control equipment shall include:

- Shut-off valve
- Pressure regulating valve
- Pressure relief valve
- Input pressure gauge
- Continuous monitoring pressure gauge

The continuous monitoring gauge shall be no less than four inches in diameter and have a pressure range from zero to at least ten psi with minimum divisions of 0.10 psi and an accuracy of plus/minus 0.04 psi.

SEPARATE HOSES: It is recommended that two separate hoses be used. One connects the control panel to the sealed line for introducing the air, and the second is used to constantly monitor the air pressure build-up. This system greatly reduces the chance of over-pressurizing the line.

PROCEDURE

LINE PRESSURIZATION: Low-pressure air shall be slowly introduced into the pipe until the internal air pressure reaches 5.0 psi.

PRESSURE STABILIZATION: After a pressure of 5.0 psi is reached, the air supply shall be throttled to maintain the internal pressure for at least two minutes.

This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

TEST PRESSURE: When temperatures have been equalized and the pressure stabilized at 5.0 psi, the air supply hose shall be shut off. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to 4.6 psi. At a reading of 4.6 psi (or any convenient observed pressure between 4.6 and 5.0 psi), timing of the test shall begin.

TIMING: A predetermined time for the duration of the test shall be used to determine the line's acceptability. The allowable time shall be calculated from Ramseier's Equation:

$$T = 0.085 D K / Q$$

Where:

- **T** = shortest time, in seconds, for pressure to drop 1 psi
- **K** = .000419 **D L**, but not less than 1.0
- **Q** = coefficient = 0.0015 cf/min/sf or internal surface area
- **D** = nominal pipe diameter, in inches
- **L** = Length of pipe being tested, in feet

Note: Use of Ramseier's Equation will result in test times much shorter than those currently used for water testing. Air-test times lower than five minutes will be typical. See UNI-B-6 for examples of calculations.