

# Conversion • Testing

## Water Test:

The DWV plumbing system is plugged leaving the top vent open. Water is then introduced to the system, purging any trapped air that may occur. The test passes if no water column is lost or no pressure drop is noted on a gauge.

## Air Test:

The DWV plumbing system is plugged at all openings including traps and vents, leaving one opening as a point to both introduce and monitor the test pressure. Air is introduced, pressurizing the system (normally 5 PSI or less), making sure all are outside the danger zone. (See safety and usage instructions.) The test passes if the measurable loss of pressure is within the time and pressure allowances of the test specifications.

## Manometer (or U-Tube):

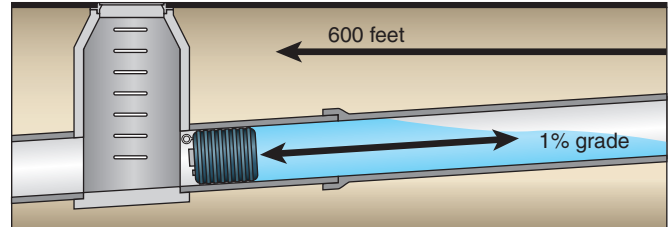
Also known as a final test, the manometer test verifies trap tightness in a new plumbing system. All traps are filled with water and all vents are then plugged. The manometer tube is first filled with water so that it “zeroes” out. Then the lower tube of the manometer is placed through a trap. A second hose is then put through the same trap and a small amount of pressure is applied. A decrease in water column measured on the manometer scale indicates that there is a leak in the system.

## Scent Test:

The DWV system is plugged at all openings except one. Liquid scent is applied in that opening, which is then plugged. Leaks are detected via smell.

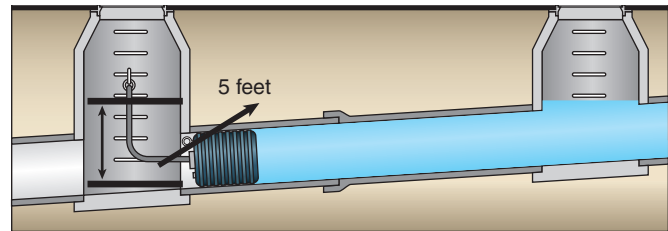
## Calculating Head Pressure/Feet of Head

- 1) Measure the distance of the pipe and multiply it by the slope of the grade.
- 2) Measure the distance of the pipe above the plug. (used when pipe is vertical)



In the example above, the answer is  $600 \times .01 = 6$  feet of head.

- 3) Attach a hose to a Muni-Ball® bypass. Raise the hose until the flow stops. Measure the height of the water in the hose.



In the example above, the answer is 5 feet of head

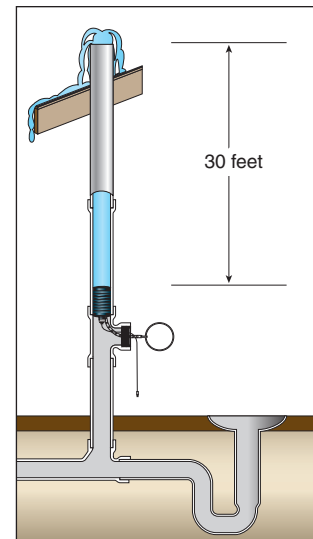
## Measures Conversion Chart

Unit	=	Conversion Factor	x	Unit
Pounds per square inch	=	14.5	x	Bars
Gallons	=	7.48052	x	Cubic feet
Meters	=	.3048	x	Feet
Inches of mercury	=	.8825	x	Feet of water
Pounds per square inch	=	.4335	x	Feet of water
Millimeters	=	25.4	x	Inches
Feet of water	=	1.133	x	Inches of mercury
Pounds per square inch	=	.4912	x	Inches of mercury
Pounds	=	2.2046	x	Kilograms
Feet	=	3.281	x	Meters
Inches	=	.03937	x	Millimeters
Feet of water	=	2.307	x	Pounds per square inch (PSI)
Inches of mercury	=	2.036	x	Pounds per square inch (PSI)

## Pressure Conversion Chart

PSI	Feet of Head	PSI	Feet of Head
1	2.31	14	32.33
2	4.62	15	34.64
3	6.93	16	36.94
4	9.24	17	39.25
5	11.55	18	41.56
6	13.85	19	43.87
7	16.16	20	46.18
8	18.47	25	57.73
9	20.78	30	69.27
10	23.09	35	80.82
11	25.40	40	92.36
12	27.71	45	103.91
13	30.02	50	115.45

Always block plugs when conducting air tests.



In the example above, the answer is: 30 feet of pipe above the plug = 30 feet of head

# Safety Instructions



## Calculating Pipeline Forces and Pressures\*

- 1) Determine the inside diameter of the pipeline in inches.
- 2) Determine the maximum back pressure.
- 3) Calculate the pipe area in square inches.  
(Pipe area =  $\pi r^2$ )
- 4) Calculate the force the plug must withstand.  
(pounds of force = PSI X pipe area)

## Formula: $\pi r^2 \times \text{PSI} = \text{POUNDS OF FORCE}$

Example: 36" diameter pipe

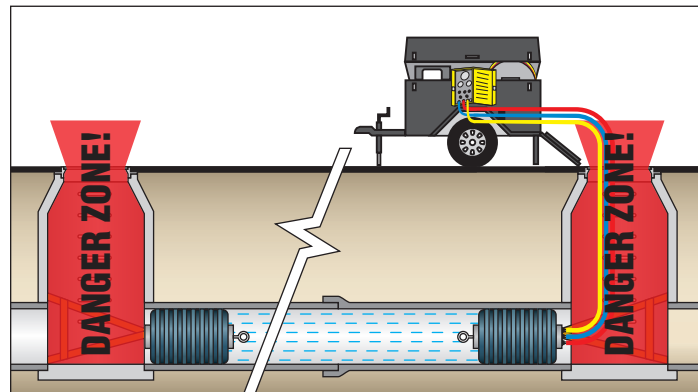
Radius = 18"

$\pi = 3.14$

PSI = 5

$18" \times 18" \times 3.14 \times 5 \text{ PSI} = 5087 \text{ POUNDS OF FORCE}$

\*Calculating pounds of force aids in building blocking systems. It also illustrates the tremendous force generated by a sewer air test.



**Stand clear of the danger zone!**  
Always block plugs when conducting air tests.

## Special Notes:

- Pressures being exerted on a plug—regardless of the medium (liquid, water, or air)—are the same. Ten (10) PSI of water is the same as ten (10) PSI of air. However, air is a compressible media. Therefore when a plug dislodges under air back-pressure, it is much more dangerous than water pressure as the air will expand to its original atmospheric volume. Use extreme caution when conducting air tests!
- Air back-pressure ratings reflect absolute back-pressure capabilities. Common engineering standards have been used to convert head pressure to PSI. It is imperative to block pipe plugs when performing air pressure tests and to ensure no one is in the danger zone when a plug is in use. Please see the Cherne Safety and Instruction Manual for complete details.

## General Safety and Usage Instructions:

- 1) Death, bodily injury, and/or property damage may result if plug fails for any reason.
- 2) Read and understand safety instruction sheet before using plug.
- 3) Must wear safety glasses and a hard hat.
- 4) Do not enter danger zone when plug is in use.
- 5) Measure pipe diameter before selecting plug.
- 6) Inspect plug for damage before and after use.
- 7) Never use a plug in a pipe size different from recommended usage range.
- 8) Always attach an inflation hose so plug can be inflated and deflated from outside the danger zone.
- 9) Never remove the inflation hose until all back pressure is released and the plug is deflated.
- 10) Must inflate plug to the pressure shown on plug.
- 11) Always use properly-calibrated pressure gauges.
- 12) Do not exceed recommended maximum allowable back pressure (refer to safety instruction sheet).
- 13) Always release back pressure from the pipe first, before deflating plug.
- 14) Check pneumatic plug inflation pressure at least every four hours.