Water Pressure

We often get calls from customers regarding the water pressure in their homes. People want to know what the pressure is at their home, what is too much pressure, what is too little pressure, or whether the pressure in the water system changes. The purpose of this information page is to answer these frequently asked questions and to give homeowners the information they need to insure their plumbing performs and lasts as designed.

What is pressure and what is the water pressure at my home?

Water pressure is a measure of the force exerted on the water within a pipe, and is typically expressed in pounds per square inch or psi. Pressure in a public water system is nothing more than the difference in elevation between the Yarmouth Water District's water storage reservoirs and the elevation of the home where the water is being served.

Yarmouth Water District's pumps lift water from its wells, to the storage tanks, through the distribution piping system. These tanks hold the water you use at your home and maintain the water pressure in the system. The maximum height of the water in the storage tanks is called the service or design elevation of the water system. All water systems are designed to provide the majority of their customers with good water pressure. When a system has different elevations in its service area, the pressure will be different depending on the elevation difference; the greater the difference, the greater the pressure.

The pressure at your home can be measured by using a pressure gauge or calculated mathematically. If you know the design elevation of the supply or source and the elevation at your home, you can calculate

the pressure at your home. Yarmouth Water District has two different design elevations in its service area, the Yarmouth and North Yarmouth pressure zones. The design elevation of the Yarmouth pressure zone is 265 feet above sea level. The design elevation in the North Yarmouth pressure zone is 407 feet above sea level. You can find your home's elevation by either locating it on a USGS map, asking Siri on your smartphone or online using Google Earth. Subtracting your elevation from the design elevation and dividing the amount by 2.31 (feet of elevation /1 pound per square inch) will give you the pressure in pounds per square inch (psi) at your location.

For example:

The elevation at the Yarmouth Town Hall is 80 feet above sea level.

265 feet – 80 feet = 185 feet, 185 feet ÷ 2.31 = 80.1 pounds per square inch or 80.1 psi

The elevation at the North Yarmouth Town Hall is 227 feet above sea level.

407 feet – 227 feet = 180 feet, 180 feet ÷ 2.31 = 77.9 pounds per square inch or 77.9 psi

Pressure in the Yarmouth pressure zone varies from a high of 110 psi near sea level to a low of about 18 psi at the top of Fairwind Lane off Route 88.

Pressure in the North Yarmouth pressure zone varies from a high of 125 psi near Bayberry Drive to a low of about 6 psi at the top of Castle View Drive.

What is too much pressure, what is too little pressure?

Water Utilities in the State of Maine are regulated by the Maine Public Utilities Commission (MPUC or PUC) and the State of Maine Drinking Water Program. The MPUC sets regulations regarding service standards, including pressure. These rules set a minimum pressure standard and do not set a maximum. MPUC rules set a minimum delivery pressure standard of 20 psi as measured at the connection to the water main. Connections below the 20 psi minimum can be made only under special agreements and these have to be individually reviewed and approved by the MPUC. The uniform plumbing code states that a home, where the pressure is expected to be in excess of 80 psi and has a check valve or backflow preventer at the service entrance of the home, and should have both a pressure regulator valve and a properly sized expansion tank on the cold water supply line. Pressure in excess of 80 psi can cause premature wear in the automatic solenoid activated valves found in dishwashers or washing machines. These types of valves operate very quickly and may result in a water hammer noise or vibrations if pipes are not anchored securely.

As far as what is the "right" amount of pressure, we've found that this is very subjective. If a customer has lived on a private well (typically at 35 psi pressure) and moves to a home on a public water system,

the will likely feel that the pressure is too high. Conversely, a customer moving from a home at sea level in a public water system will find the pressure at a home on a well as being inadequate.

What is a check valve or backflow preventer and how do I know if I have one at my home?

A check valve is a one-way valve that is typically installed at the water meter of a home. The purpose of the check valve is to prevent water from flowing backwards from the home back into the water system, therefore reducing the possibility of introducing contamination into the system. A backflow flow preventer is also a one-way valve that prevents a reversal of flow reversal. It differs from a check valve (which is the simplest form of backflow preventer) in that it is a licensed device and it must be tested periodically to insure that it is working properly. These types of devices are used in situations where there may be a higher risk to the water system should a flow reversal occur. Some common applications for backflow preventers are irrigation systems, fire sprinkler systems, any industrial setting.

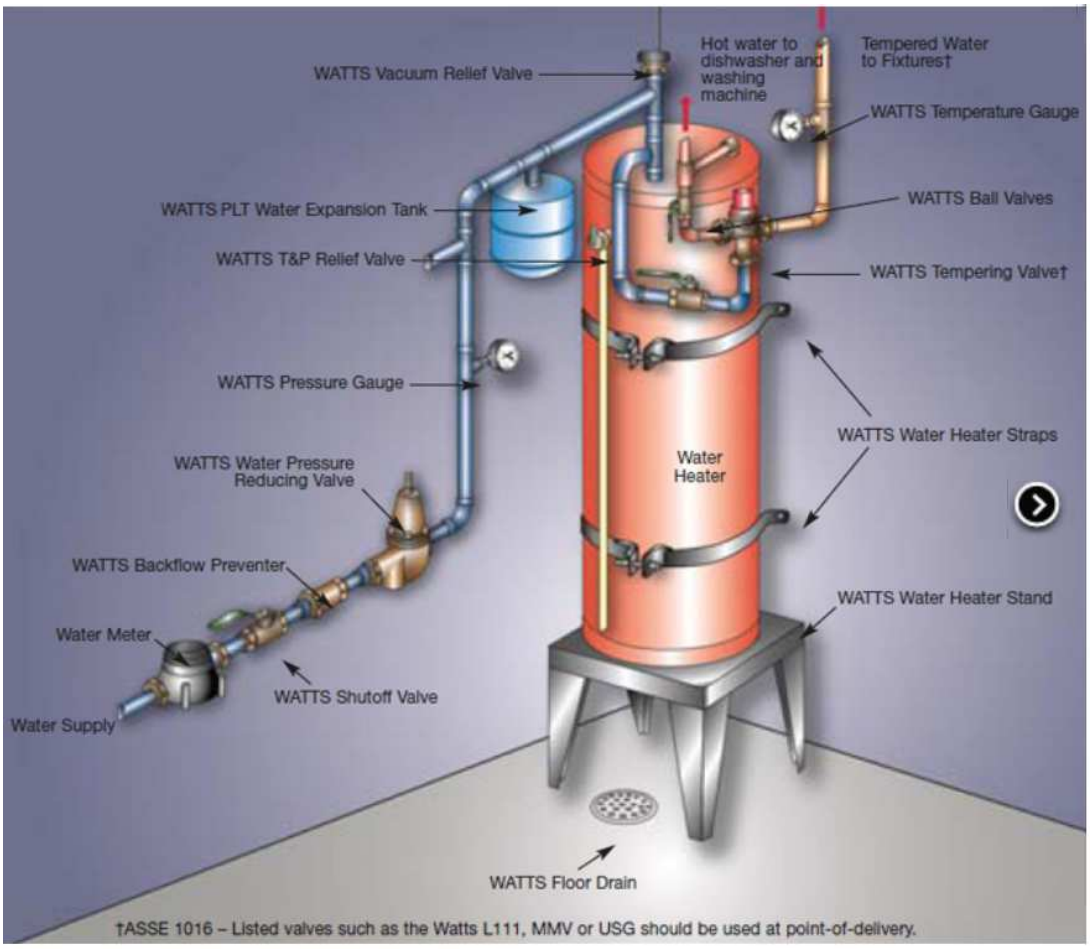
You can check your meter setting (typically in the cellar) and look for the device, a typical meter setting is pictured below with the technician pointing to the check valve.

All water connections installed after 1972 are required to have a check valve as part of the meter installation. Older connections without check valves are upgraded to the new standard when the meter setting is changed or upgraded. Eventually all connections will have some sort of backflow preventer.

Want to learn more about residential backflow prevention? Visit the Watts website for a great brochure on the subject at : **http://www.watts.com/pages/literature_thumbs.asp?catId=65&pageId=157**

What is Thermal Expansion?

Thermal expansion of water becomes a problem in homes when the plumbing system has a backflow preventer or check valve at the service entrance. Water expands when heated and the expansion of the water in a closed piping system results in an increase in pressure. These increases can be quite dramatic, and can result in relief valves releasing or hoses bursting. All boiler and hot water heater installations should include a properly sized expansion tank as part of the installation. These tanks give the expanded water a place to go as it heats, therefore maintaining pressure at safe levels in the system. The diagram below, courtesy of Watts Water Technologies Company, shows a proper installation with a pressure reducing valve at the service entrance and an expansion tank on the water heater feed line.



Control Thermal Expansion in Hot Water Supply Systems

Does the temperature -pressure relief valve on my boiler or hot water heater serve as a water pressure regulating device?

No, these are safety devices only. These valves are not designed for repeated uses and should not be expected to regulate pressure on an on-going basis. Manufacturers recommend that these valves be exercised on a semi-annual basis, something in our experience that rarely happens.

Does the pressure in the water system change?

Yes, but very minimally. The elevation of water in our tanks typically varies about 13 to 16 feet, which equates to a range of 6 to 8 psi. This small fluctuation is usually not an issue for most customers.

Why do my pipes rattle when the dishwasher stops or the washing machine changes cycles?

Noise from the plumbing is mostly usually associated with pipe movement or vibration. This can occur when piping is not secured properly with pipe hangers and brackets. The automatic valves in dishwashers and washing machines operate extremely fast and when the water stops abruptly in a pipe that can move it creates a noise or vibration. We call that phenomena *"water hammer"*, in extreme cases water hammer can lead to premature wear in plumbing and valves.

My garden hoses do not seem to last and they have actually burst on occasion, how come?

If you leave your garden hose filled with water after using it in the yard you may be witnessing thermal expansion at a local level. The water in our water mains is quite cool in comparison to the summer temperatures, typically ranging from 40 to 50 degrees. When you turn off the hose bib (outdoor faucet), you have created a closed system. When the sun heats the water in the hose it has to expand and this can result in a burst hose. If you have left the hose bib on with the hose off, you may still have a closed system as most new hose bibs have a backflow preventer incorporated in the design. If the hose bursts in this case if will flow until someone discovers the problem.

What Questions should I be asking my plumber when I have a service call ?

What is the water pressure at my home?

Do I need a pressure reducing valve and an expansion tank?

Do I have a condensing boiler and does this require extra maintenance and have you been trained on this type of boiler and its maintenance?