

THERMAL EXPANSION

Our records indicate you have, or will soon be installing a backflow prevention assembly on your private water service line, or you are applying for a Charleston CPW water service, or your existing water service is being renewed. Our water meters include a residential dual-check valve. This assembly prevents the potential of backflow from your private water system into the public water distribution system. Backflow is the unwanted, reversal of normal flow from the customer's system into the public's water system. Additionally, this installation causes the private plumbing system to become a "closed" plumbing system.

The installation of the backflow prevention assembly is required in order to comply with the U. S. Environmental Protection Agency Safe Drinking Water Act, SC Department of Health and Environmental Control (DHEC) Safe Drinking Water Act, Section 44-55-40-d, and the Primary Drinking Water Regulations, Section R.61-58.7 (F), and our Water Rules and Regulations. These rules require public water utilities/purveyors to implement programs for eliminating and controlling cross-connections. A **CROSS-CONNECTION** is any link or connection, direct or indirect, temporary or permanent, between the customer's private water system and the public potable water distribution system through which any gas, liquid, particle, or other undesirable element could enter the public potable water distribution system. Essentially, all recognized plumbing codes used by cities, municipalities, counties, or states require **BACKFLOW** to be eliminated or contained. However, it is necessary to inform you of a related condition that may affect your water heater by the installation of a backflow prevention assembly or a residential dual-check valve.

Prior to the installation of a residential dual-check valve or a backflow prevention assembly, the public water distribution system had provided a "cushion" which absorbed the pressure build-up within the private plumbing system/water heater by allowing the heated and expanded water from the water heater to backflow into the public water distribution system. By Federal and State definition, reverse movement or backflow from an unmonitored source and/or a private plumbing system into the public water distribution system is strictly prohibited.

The water heater in your home/business goes through a "recovery process" each time hot water is used. Normally, this process occurs several times daily, depending on how often hot water is demanded. As the hot water is used, it is replaced with cold system water and the water heater begins to heat that water to the desired temperature setting on the water heater. This recovery cycle creates a condition known as **THERMAL EXPANSION** — as water is heated, it expands. Since water is an incompressible liquid, it must expand by any means available. Water heaters are equipped with a temperature and pressure (T & P) relief valve, which is designed to relieve excessive temperature and pressure within the heater enclosure. This T & P valve is an **emergency relief valve**, and is not intended to compensate pressure increases created by thermal expansion.

The installation of a backflow prevention assembly, residential dual-check valve, swing-check valve, or pressure reducing valve makes the plumbing system a “closed” system, and prevents the heated/expanded water from being forced backflow into the public water distribution system. The Thermal Expansion phenomenon may cause the T & P valve to leak, household plumbing fixtures to drip, solenoid valves on the icemaker and dishwasher to malfunction, toilet ball-cocks to leak, or washing machines hoses to burst. Extreme Thermal Expansion may cause serious harm to the water heater, particularly if the water heater is gas-fired! Most, if not all manufacturers of water heaters automatically invalidate their warranty if the water heater is installed on a “closed” plumbing system without proper thermal expansion protection.

Thermal Expansion can easily be contained by the use of a Thermal Expansion Relief Valve, Thermal Expansion Ball-Cock, or a Thermal Expansion Tank. These products are available from most plumbing supply stores. Some of the manufacturers producing these devices are Amtrol, Conbraco, Febco, Watts, Wilkins.

Often, plumbers will attach a pressure gauge to your hose bibb and may tell you the water purveyor supplying the water is delivering it at excessive pressure levels. CPW distribution system water pressure is normally about 90 PSI. The excessive water pressure indicated by a pressure gauge is most likely **THERMAL EXPANSION**.

CPW has installed a residential dual-check valve in all residential water meter boxes since 1985. This dual-check valve prevents backflow, but it creates a “closed” plumbing system. You are encouraged to have a licensed plumber inspect your plumbing system to determine if it is a “closed” system. If so, you will need to install or have installed a device of your choice to eliminate thermal expansion. Failure to address this problem within your private premises may cause serious damage to your water heater or plumbing fixtures. The water utility/purveyor is not responsible for any damage to private property caused by Thermal Expansion. For your information, since 1994, the Standard Plumbing Code, International Plumbing Code, and CABO-One and Two Family Dwelling Code (Southern Building Codes Congress International) mandated the use of Thermal Expansion protection on any “closed” plumbing system.

Additionally, if your existing plumbing system is supplied by a well, it will be necessary to physically and permanently disconnect all plumbing fixtures from the private well prior to connecting to a public water distribution system. This is a DHEC requirement.

Please feel free to call our department at 727-7105, 727-6980 or 727-6981 if you have additional questions.

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Cross-Connection Manager
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