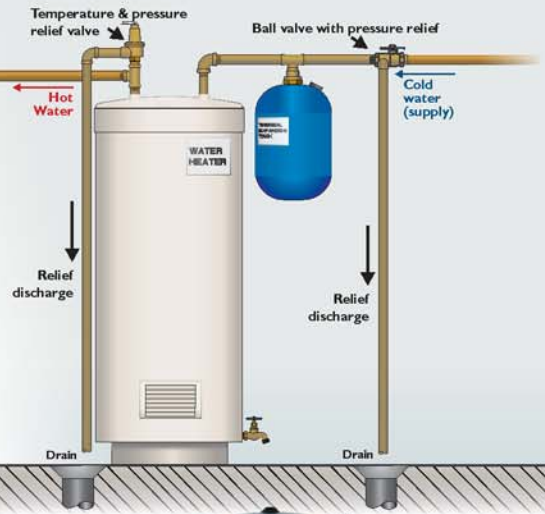


the Repair Guys



In our line of work, we field questions from contractors and technicians concerning repairs, installations, and general backflow prevention practices. We'd like to share some questions we receive and our answers. Everyone has different opinions on these subjects and we would like to hear yours. Contact us with your questions and ideas via email at: imark@backflowparts.com or mail us at American Backflow Products Co., Post Office Box 37025, Tallahassee, FL 32315.

— Mark Inman and Jason Gregg

QUESTION —

I have been installing backflow prevention assemblies for twelve years. My water authority has just recently notified me about thermal expansion and that I must address this problem when I make installations in the future. Is this a new problem? Can you tell me some basics about thermal expansion and how it relates to backflow assemblies? Can you let me know what products are available to help with thermal expansion?

Mark -

No, thermal expansion is not a new problem nor is it caused by backflow assemblies. The only thing new about thermal expansion is that, in some areas, it is just now being addressed. In fact, thermal expansion is not a problem at all. It is simply a condition that exists when system water is heated. Problems arise when thermal expansion is present within a closed piping system during periods of

Relief valves are located near the water heater. They are manufactured in different types and sizes.



Expansion tanks are sized according to the size system they are protecting..

non-use. If you install backflow assemblies, or any other type of control valve, it is very important to understand what thermal expansion is and how to keep it under control. First, let's take a look at exactly how and when it occurs.

- Jason

Basically, when water is heated it expands. This is called thermal expansion. When water is heated, its density decreases and its volume expands. In other words, as water is heated, it takes up more space. A good example would be as water is heated in a fifty-gallon (190 L) residential water heater from 90 to 140 degrees F (32-60 °C,) the actual volume of water would expand by one-half gallon (1.9 L.) Since water is not compressible, the extra volume of water must go somewhere. Normally when this happens, the expanded water flows back to the system supply. The expanded water can also be dissipated very quickly if someone uses hot water down stream. Thermal expansion also exists in systems without water heaters. A good example would be a fire-sprinkler system with piping close to a roofline of a building in which the daytime heat is radiated into the piping.

Mark -

As long as the expanded water has a nice easy path to flow back into the supply system, you may never even realize that it occurs. If you introduce a backflow preventer, pressure reducing valve, dual check valve, or any other one-way valve into the piping, you have closed the system. If there is no water flowing down stream (periods of



Uniform Plumbing Code - 2000 edition.

Section 608.3 - Any water system provided with a check valve, backflow preventer or a pressure regulating device which does not have a bypass feature at its source shall be provided with an approved, listed, adequately sized pressure relief valve or a means to control expansion.

...
In addition to the required pressure or combination pressure and temperature relief valve, an approved, listed expansion tank or other device designed for intermittent operation for the thermal expansion control shall be installed whenever the building supply pressure is greater than the required relief valve pressure setting or when any device is installed that prevents pressure relief through the building supply. The tank or device shall be sized in accordance with the manufacturer's recommendation.



International Plumbing Code - 2000 edition.

Section 607.3 Thermal expansion control. A means of controlling increased pressure caused by thermal expansion shall be provided where required in accordance with Sections 607.3.1 and 607.3.2.

...
Section 607.3.2 Backflow prevention device or check valve. *Where a backflow prevention device, check valve or other device is installed on a water supply system utilizing storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.*

non-use) and the system is closed, then pressure will begin to build within the piping system. Many times we may not realize the effects of thermal expansion or the stress that it places on piping systems. Normally, the pressure can increase until the water heater's T&P (temperature and pressure) relief valve opens. This may be indicated by a constant drip from the T&P valve. You may also be able to identify increased pressures from leaky toilet tank fill valves or faucets. In Jason's example of a fire-sprinkler system, an indication of thermal expansion would be a badly worn check valve number 2 disc in the backflow assembly.

- Jason

Increased water pressure that builds up within the piping system due to thermal expansion can also cause more serious problems. If the T&P relief valve is not operating correctly then dangerous pressures can distort or rupture the water heater or the internal components such as the flue way. Obviously, pipe, pipe fittings, valves, and connections can be affected as well. As you can see, thermal expansion is very common and can become a dangerous problem once the system is closed. In the next issue we will talk about some of the products available to help control thermal expansion.

[dw&bp](#)



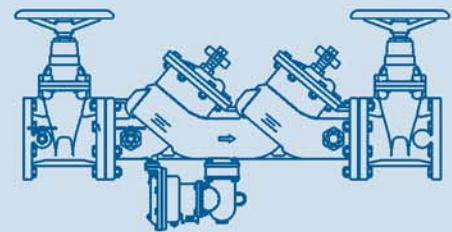
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