

Backflow Preventer Installation May Create a Thermal Expansion Danger

Most homes are supplied with hot water from an electric or gas heated tank. Until the heating element stops working, and one is faced with a cold shower, the water heater is usually taken for granted. However, if not properly maintained, a water heater may become a safety hazard.

Water expands in volume as its temperature rises. The extra volume caused by thermal expansion must go somewhere. If not, the heated water creates an increase in pressure. This is the principle of a steam engine.

The temperature and pressure in the water heater is reduced when hot water is withdrawn from a faucet and cold water enters the tank. The increase in pressure and thermal expansion can also be reduced by water flowing back into the public water system. However, when a

check valve, pressure-reducing valve or backflow preventer is installed in the service pipe a “closed system” is created. Provisions must be made for thermal expansion in these cases.

The thermostat of the water heater normally maintains the water temperature at about 130° F (54° C). However, if the thermostat fails to shut off the heater, the temperature of the water will continue to increase.

If the water temperature increases to more than 212° F (100° C), the water within the tank becomes “super-heated”. When this super-heated water is suddenly exposed to the atmosphere when a faucet is opened, it instantly turns to steam. As the pressure within the tank continues to build up under super-heated conditions, the tank may explode.

What Can a Property Owner Do to Ensure Protection from Thermal Expansion Danger

- The homeowner should check to see that an expansion tank and temperature and pressure relief valve (T & P Valve) are in place.
- If there is any doubt, the homeowner should contact a licensed plumber to inspect the hot water system.
- A drain line must be installed to avoid water damage and scalding injury when the valve operates. Water discharged from the drain line, may indicate a normally operating T & P Valve or a worn or damaged valve. Consult a plumber when in doubt.
- The T & P Valve should be periodically removed and visually inspected for corrosion deposits and to insure it has not been improperly altered or repaired.
- Some T & P Valves are equipped with a test lever. Manually lifting the lever unseats the valve, allowing water to discharge. The T & P Valve should be periodically inspected to ensure that it is properly operating. If water continues to leak from the T & P Valve after closing, the valve may need to be replaced. Here is a link to an instructional YouTube [video](#).
- Installation specifications may vary; the above work can be done by a licensed plumber. Installations should always be done in accordance with the manufacturer’s instructions.

