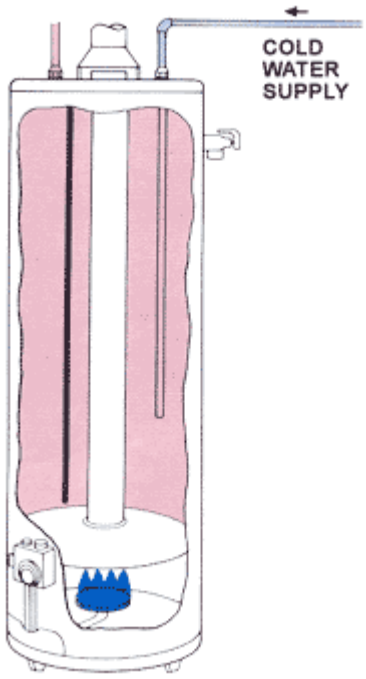
WHY THERMAL EXPANSION...?

Problem

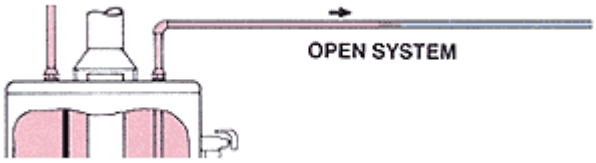
WHEN WATER IS HEATED...

It expands! Reacting to physical law, water expands in volume as its temperature rises.



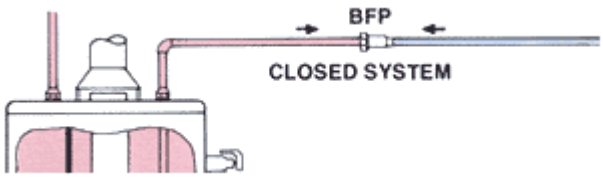
In a 40-gallon water heater, for example, water being heated to "recover" after water usage, will end up expanding to about 40.53 gallons when desired temperature is reached.

IN THE "GOOD OLD" DAYS



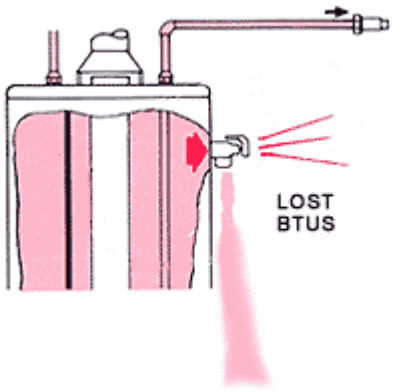
Before the advent of cross connection control, expanded water which exceeded the capacity of the water heater....flowed back to the city main where it was easily dissipated. It was "open" at the city supply side of the system....even though it was "closed" on the system side.

CROSS CONNECTION CONTROL MEANS "NO RETURN"



Today, with back flow preventors, water meter with check valves and/or pressure reducing valves without a bypass being installed, expanded water from a water heater cannot return to the city supply. It is now a closed system. And expanded water has no place to go.

WATER IS NOT COMPRESSIBLE



Since water completely filled the water heater and system piping before recovery started, and since it can't be compressed....the expanded volume, even though small, has no space in which it can be accommodated.

As a result, the expanding water creates a rapid and dangerous pressure increase in the water heater and system piping, much like the action of a hydraulic ram.

SO "POP" GOES THE RELIEF VALVE

The setting on the safety relief is quickly reached and the relief valve opens, losing heater water down the drain....or, more often than not, all over the floor.

This illogical practice of operating your safety valve, once or twice a day, is not only wasteful... (you paid money to heat that hot water that went down the drain)....it's also dangerous.

First of all....the T & P relief valve you have installed serves as an emergency control only. It never was designed as an operating control. Once a safety valve is used on a daily basis, it isn't that safe.

Deposits on the seat....deteriorating springs.... wear and tear erosion can wear out a relief valve in no time at all.

DANGEROUS PRESSURES BEFORE RELIEF

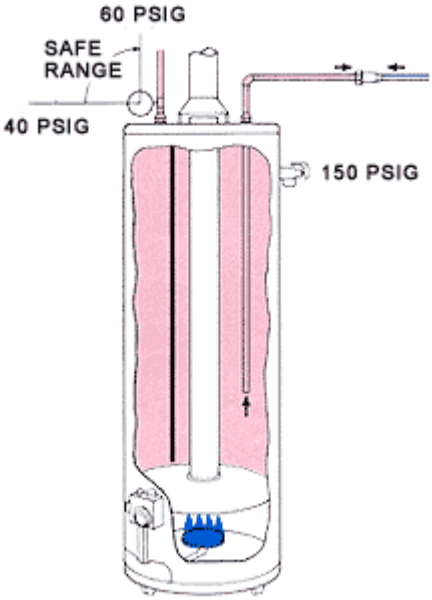
What most people don't realize is that dangerous conditions can exist during thermal expansion long before the relief valve operates.

Internal pressures repeatedly occurring during recovery periods can collapse the center flue of a gas-fired water heater....creating a hazardous presence of deadly carbon monoxide gas.... or even a water heater explosion.

Even though the relief valve operates during each recovering period, internal high pressures occurring over and over again can accelerate tank leakage, and shorten water heater life....no matter how it is fired.

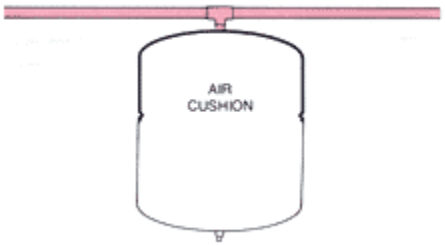
SOLUTION

Solution

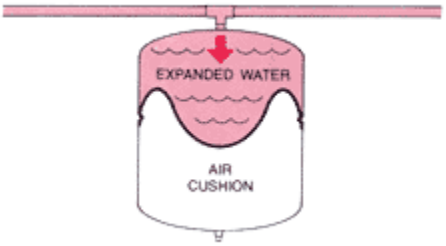


CONTROLLED PRESSURE RISE DURING THERMAL EXPANSION

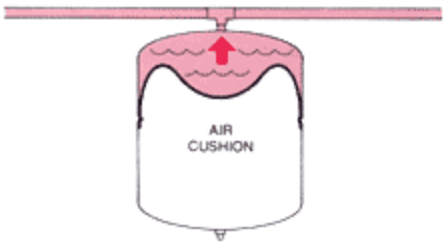
The best solution to thermal expansion is to control pressure it generates within normal, safe operating range, well below the emergency setting of a relief valve. This will allow thermal expansion to occur, but without causing a dangerous increase in pressure.



This can easily be accomplished by adding a small expansion tank with a sealed-in compressible air cushion which will compress as thermal expansion occurs....providing a space to hold and store the additional expanded water volume.



By sizing the air cushion according to Boyle's law, we can select the maximum pressure on the system when the total amount of expanded water has been generated.

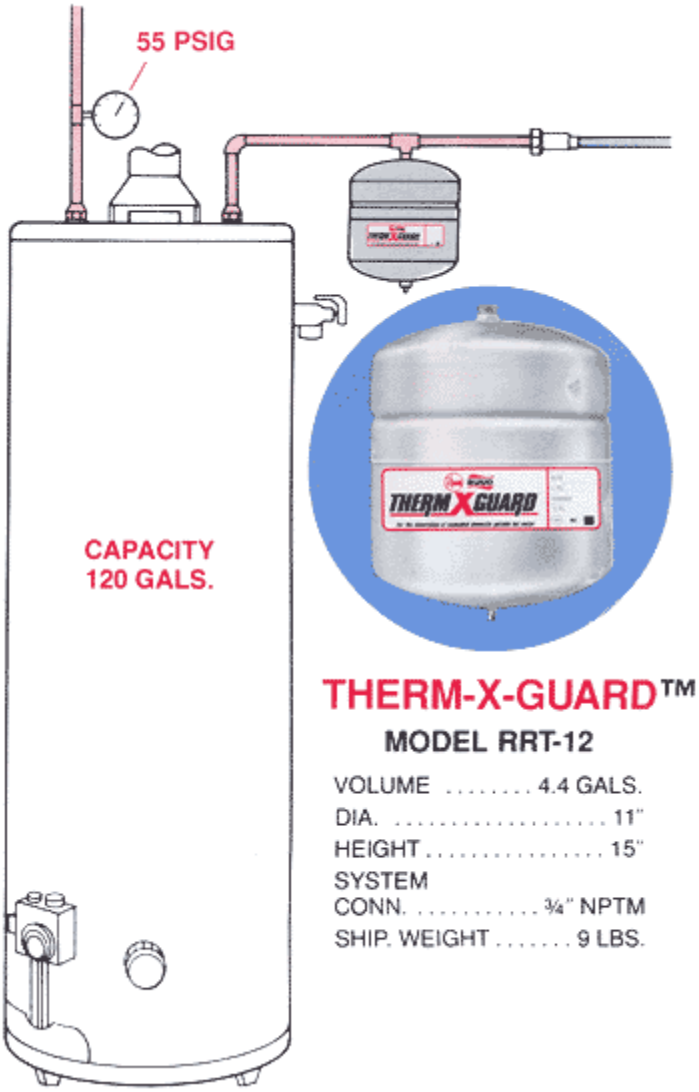


When hot water is used in the system....the pressurized air cushion forces hot water back into the system for use....not waste.

The thermal expansion tank features the sealed-in air cushion....pre-charged to the minimum system pressure before recovery is started. A rugged butyl diaphragm seals in the air cushion and also separates air from hot domestic water to prevent air from being dissolved by hot system water.

Finally, on the water side of the expansion tank is a separate rigid polypropylene liner so fresh, corrosive domestic hot water can be handled without fear of corrosion and leaks.

The thermal expansion tank for domestic water heaters, sized right, is the only logical answer to the growing problem of thermal expansion in water heaters protected by BFP, check valves or pressure reducing valves. A simple installation to the supply side on the water heater, the small tank will eliminate the dangerous condition so that the relief valve will never open.



The THERM-X-GUARD ™ Model PRT-12 or equivalent, with a volume of only 4.4 gallons, will safely handle thermal expansion of residential water heaters up to 120 gallons in size.