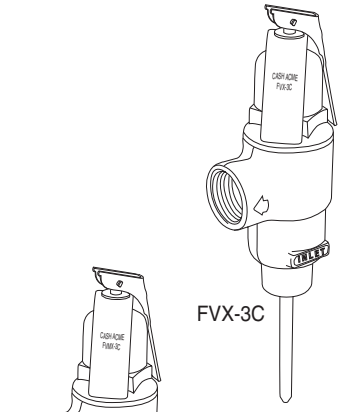
T&P Valve General Information

DESCRIPTION

A T&P relief valve for water heaters or hot water storage tanks is an emergency safety device. When properly installed, the valve allows water to discharge when conditions arise that require such an action. These conditions can be either excessive pressure or dangerously high temperature, or both. In the event of excessive pressure, the T&P valve will open to relieve the pressure by discharging an amount of water to waste. In doing so the pressure of the water in the tank is reduced. In the event of excessive temperature, the T&P valve will open and discharge an amount of water. In doing so cold water enters the tank to replace the discharged hot water, thus bringing the overall temperature of the tank back down to a safe level.



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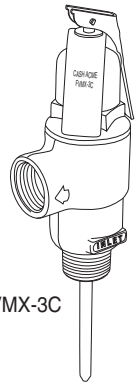

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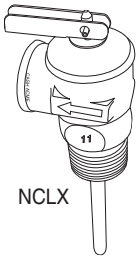

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DRAIN LINE: Given the above functions of the T&P relief valve, a correctly installed drain line is essential. The drain line should terminate in a location that will not cause personal or property damage in the event the T&P valve discharges. The drain line should be installed in conjunction with a drain or trap that conveys any discharged water safely to waste. The most common problem with a water heater installation is an absent or incorrectly installed drain line. It is essential to install a drain line in accordance with the relevant codes.

THE EFFECT OF EXCESSIVE WATER PRESSURE

In the event the pressure within a tank increases in an uncontrolled fashion, the tank may split. If this happens there is obviously scope for water damage to property. This is an undesirable occurrence, and the use of a T&P valve will act to prevent the excessive build up of pressure.

Excessive pressure on its own, so long as the water temperature remains under 212˚F, will not cause an explosion. Water is effectively incompressible. When a split occurs in a tank only a very small amount of water needs to be forced out before the pressure within the tank drops to atmospheric pressure. Therefore there is no forceful bursting of the tank.

THE EFFECT OF EXCESSIVE WATER TEMPERATURE

Excessive water temperature in a tank is dangerous. It is a physical characteristic of water that while under pressure it can be heated above 212°F and still not boil. For example, at a pressure of 150 psi water does not boil until 358°F. Thus if there was no means of controlling the temperature within the tank, the pressure could be held to 150 psi, while the temperature of the water within could be as high as 358°F. The danger comes if there is a failure of the tank under these conditions. If there is a split in the tank, the water within would be free to release to atmosphere. But, under atmospheric conditions water cannot exist at 358°F; it will turn to steam. The key factor to consider is that 1 cubic inch of water will become 1 cubic foot of steam. In the event of a tank rupture all the water within the tank will instantly "flash" to steam and in doing so increase to more than 1,700 times the volume of the water. This gives rise to an extremely explosive force that can cause significant property damage and loss of life.

CAUSES OF WATER HEATER EXPLOSIONS

As seen above, excessive water temperature can set-up the conditions for an explosion. However, the tank itself must fail (split) in order for the over-heated water to escape as steam. Thus, there are two contributing factors to a water heater or hot water storage tank explosion: (1) excessive temperature water within the tank, and (2) a physical weakness in the tank itself, possibly due to age, corrosion or general deterioration. It must be noted that water heaters are designed to operate at temperature in the region of 140°F. Water temperatures in excess of 212°F place the heater under additional stress, and so are more likely to exploit any weakness in the tank.