

What is a Temperature/Pressure Relief (TPR) Valve?

Section P2803.1 of the International Residential Code for One and Two Family Dwellings requires the installation of a combination Temperature/Pressure Relief Valve (commonly referred to as a TPR valve) or a separate temperature relief valve and a pressure relief valve on every water heater.

The purpose of the TPR valve is to provide an important safety mechanism that allows for the immediate discharge of excess temperature and pressure that builds up inside the tank as the water is heated. If not allowed to properly discharge, this excess temperature and pressure will eventually cause the tank to explode.

Figure 1: Shows a typical Temperature/Pressure Relief (TPR) Valve installation on a gas water heater.



Consequently, Section P2803.3 dictates that a TPR valve must discharge once the pressure inside the tank reaches 150 psi (pounds per square inch).

Section P2803.4 specifies that the TPR valve must be installed within the top 6 inches of the water heater tank in order to enable the valve to discharge at a temperature of no greater than 210°F. As a result, any discharge piping must be rated to withstand at least 210°F to prevent melting and blockage of the TPR valve when discharged.

Common Violations in the Field

The presence of a functioning Temperature/Pressure Relief (TPR) Valve on a water heater is extremely important. However, there are other factors to consider in ensuring the protection of property and people who may be standing near the water heater when the valve actually discharges. Namely, where does the scalding water or steam go once the valve is allowed to discharge?

1) Improperly-Sized Discharge Pipe

Section P2803.6.1 requires that the TPR valve is fitted with a discharge pipe that provides the same size opening as the valve outlet itself.

Figure 2: Shows a TPR Valve that has been fitted with a discharge pipe that is smaller than the size of the valve outlet. This is a common defect that is strictly prohibited because smaller discharge pipes restrict the flow of the pressurized water released by the valve. This creates a dangerous build-up of pressure at the point of discharge that can cause the tank to explode.



2) Missing Discharge Pipe

The discharge pipe required in Section P2803.6.1 was never installed at all. This normally occurs during replacement or initial installation of the water heater.

Figure 3: Shows a missing TPR discharge pipe. This creates a dangerous condition whereby the TPR valve will spray scalding steam or scalding hot water onto anyone (or anything) that happens to be near the water heater when discharge occurs. When you consider that the TPR valve discharges water at 210° F., serious injury or property damage will result.



3) Improper Termination of the Discharge Pipe

Ideally, the TPR valve discharge pipe will be vented to the outside of the building where the scalding water or steam can be discharged without posing a threat to people or property. However, in many installations direct piping to the outside is not possible or is deemed to be too costly to provide. Accordingly, Section P2803.6.1 does allow for the discharge pipe to terminate inside a receptacle or drain pan as long as an air gap is provided between the end of the discharge pipe and the top rim of the drain pan itself without creating a hazard or potential cause of damage.

Figure 4: The copper discharge pipe runs down the right hand side of the water heater tank to terminate below the upper rim of the metal drain pan below. First, because of back-siphoning there is a potential of contamination to the water supply. Secondly, because of the pressure and temperature of the water being released there is a potential for injury from spray.



Figure 5: Shows a drain pan that tightly fits the base of the water heater. This installation will in no way catch the water or steam from the TPR valve, rendering the drain pan useless.



Summary

The Temperature/Pressure Relief (TPR) Valve serves an extremely important function ensuring the safe and proper operation of the water heater. As a professional home inspector, I encourage home owners to take the time and effort to identify and correct them.

Consequently, the conditions presented in this article should be corrected immediately by a qualified and licensed contractor.