The Importance of Thermostatic Mixing Valves to Protect Against Scalding: Part One

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Anyone that has been scalded knows how painful it can be. When water is hot, it doesn't take long for flesh to burn, and children's skin burns more quickly. Also, at higher risk are older people who react more slowly, and are more susceptible to burns as a result. As inspectors, our home inspector training teaches us about important components like this to provide advice that will protect our clients' well-being. Let's take a look at how quickly a serious burn can occur:

Temperature	Time to produce serious burn
49°C / 120° F	More than 5 minutes
54° C / 130°F	About 30 seconds
60°C / 140°F	About 5 seconds
66°C / 150°F	About 1 ½ seconds
68 °C / 155°F	About 1 second

As a result of the speed at which people can get burned, legislation was introduced to require thermostatic mixing valves on any new or replacement water heater installation. The requirement in Ontario (Ontario Building Code 7.6.5) went into effect in the fall of 2004.

Why Now?

Every year there are hundreds of people burned by domestic hot water.

A hot water tap delivering 140°F water can cause a burn quickly. Single lever faucets mix hot and cold water, but can still deliver straight hot water.

There's an additional problem with single-lever shower valves. If a person sets the mix of hot and cold water to produce a comfortable temperature, they may get a blast of pure hot water if the cold water pressure drops suddenly. This often happens when someone flushes a toilet or turns on another tap, for example.

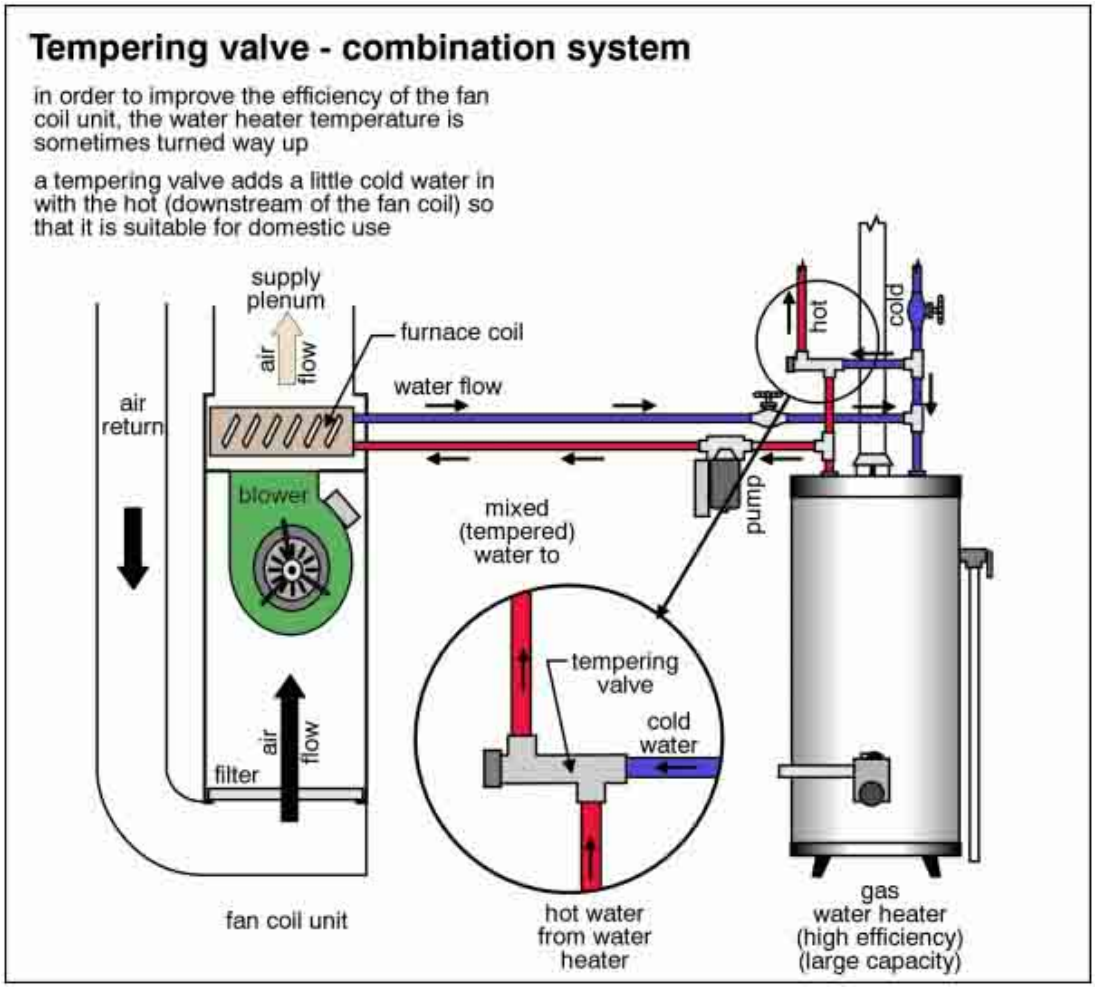
Before thermostatic mixing valves, protection at tubs and showers was provided via pressure balanced or thermostatic control valves.

Pressure balanced valves are the more common of the two and are usually a single lever in a tub or shower. As the handle is rotated, the ratio of hot to cold water changes until the desired temperature is reached. When that ratio is impacted (e.g. by a toilet being flushed), the valve adjusts (restricts the hot water coming out of the faucet) to maintain the initial temperature.

The problem with these valves is that they don't sense the temperature; only the ratio of hot to cold. Therefore, if you turn the valve all the way to hot, water comes out at the same temperature as a water heater that was set too high.

Thermostatic valves, on the other hand, have two controls: one for the volume of water and one for temperature. These are safer because the manufacturer or installer can set the limit within the valve itself to prevent an unsafe setting. They are also more convenient because the temperature can be left in your favorite position and all you have to do is turn the water on the next time you jump in the shower.

The downside to these units is they are more expensive and can only serve/protect one fixture (tub, shower, sink).



Tankless Water Heaters

Many of these units have built-in temperature limiters. In these cases, a tempering valve is not always required. You will have to check your local building code.

Long Heating Runs

Where the water heater is a long distance from the faucet, the temperature drop can be significant. In these cases tempering valves (or faucets with integral tempering devices) can be installed.

What's the Cost?

The retail cost of the valves at some of the larger retail chains is just under $100. A plumber may charge $100-$200 to install it.

In Part Two of this post, we take a look at the benefits of using a thermostatic mixing valve, and why turning the water temperature down is *not* the solution. See you at Part Two!

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