

# leading off



## Know Your Water Temperatures

Lately, I have been spending some “quality time” in various hotels and in a couple of cases I have wondered, “How hot is the water coming out of the faucet going to be, and how hot is it kept by the water heaters/boilers?”

Then I rethink the code requirements for domestic water and feel better, as the water does not scald me and I have not heard of an outbreak of Legionnaires disease from that hotel. The chart below shows the time required for a typical scald injury where time and temperature will lead to various burn degrees.

Water Temperature		Scald Injury	Amount of time exposed to an actual water temperature will determine the level of burn potential as a 1 <sup>st</sup> , 2 <sup>nd</sup> or 3 <sup>rd</sup> degree burn.
155°F	69°C	Immediate	
150°F	66°C	1 second	
140°F	60°C	2 seconds	
130°F	54°C	5 seconds	
125°F	52°C	30 seconds	
120°F	49°C	3 minutes	
115°F	46°C	35 minutes	
100°F 110°F	43°C	Normal Showering/Bathing Temperature (for most adults)	

Source: ASSE International—Understanding Potential Water Heater Scald Hazards, 2013

All we need for a safe and comfortable temperature is approximately 100°F-110°F (38°C-43°C) at the faucet.

The next step is to ensure that we prevent the potential development and growth of Legionella bacteria within the domestic hot water system. These can be directly linked to cooling towers, potable hot water systems, hot tubs and decorative fountains. As a result, standards and codes have

been created to prevent/reduce the opportunities of Legionnaires bacteria to reproduce in these systems.

The chart below shows that water tank/storage temperature is to be maintained at a minimum of 140°F to prevent the bacteria from developing and growing.

Temperature		
158°F	70°C	Temperature required for disinfection
151°F	66°C	Legionella bacteria die within 2 minutes
140°F	60°C	Legionella bacteria die within 32 minutes
131°F	55°C	Legionella bacteria die within 5-6 hours
122°F	50°C	Above this, bacteria can survive but do not multiply
95°F – 115°F	35°C – 46°C	Ideal growth range
68°F – 122°F	20°C – 50°C	Legionella growth range
68°F	20°C	Below this, bacteria can survive but are dormant

Source: ASSE International—Understanding Potential Water Heater Scald Hazards, 2013

This is where the mixing valve comes into play. According to many codes, jurisdictions and standards, a mixing valve is mandatory as part of the domestic water system to prevent scalding while maintaining water temperatures in the tank high enough to prevent/reduce the risks of producing the potentially deadly bacteria. Codes are a good thing if they are properly applied, and more importantly, understood as to their purpose and installation requirements. ☁

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