

HOT WATER HEATER – BAD CHECK VALVES

To answer Goodspike's question on how hot water scalding can occur, first you have to experience it. Then you know it's possible. As for why it's possible? That's a bit hard to explain, but I think I figured it out.

First, you have to be boondocking. ...Meaning, there is no hose pressure coming in... and only your RV pump will be running (on-off-on) as needed.

Second, it might be necessary for the hot water tank to lose or partially lose that air gap that is supposed to be there so water can expand in the tank. I.e., without the air gap tank pressure will increase to potentially unsafe (HIGH) levels. And this is why you have a Safety Pressure Release Valve; and why you hear stories of hot water tanks exploding. So yes... there is a lot of water pressure that builds up in your hot water tank; and if the TOP check-valve fails then you can't get rid of the pressure any other way except through the cold water line... which occurs when you turn on your shower valve, for example.

Note: Many people, including myself, have fixed hot water shower temperature fluctuations by purging the Safety valve to remove water in the tank. This re-establishes the air gap. ...But when you have a partially stuck check-valve, you might notice your shower handle "sweet spot" (102F) starts to change, even though you can still shower like normal.

MY STORY: For about 3-4 days I was experiencing odd shower water temperature fluctuations while I was traveling and boondocking. And toward the end there were times when all I could get was cold water out of my shower head. That's when I started to investigate, because I hate cold showers in 40F outside weather or 80F weather:

==> I removed the BOTTOM check valve in my tank and found a spring and the check valve plate barely hanging on. It was destroyed, but it was not blocking the cold water flow into the tank. (And who knows how long it was like that? Probably years.)

==> Then I removed and found the TOP check valve was frozen shut. **So bingo:** No Hot water was being allowed to pass through. But why was I getting "flashes" of very, very hot water?

OTHER INFO: Your shower valve is a mixing valve, and if you don't have a hot water source then cold water will come out of the shower head even when you turn the valve all the way to hot. ➔ And the reverse is true too.

So the question becomes, how does hot water get into the cold water line? Answer, stuck and/or partially stuck check valves; or a bad 3-way valve, which has been known to fail, but not that often. Remember, your RV hot water thermostat is set at 140F, and most people like 102F showers.

So I have 2 theories on how these no-good check valves cause problems:

A) When the check-valve is barely working it "pops open, then closed, then open" ...and the results are bursts of hot water. This is annoying, but probably does not lead to scalding.

B) Scalding is a bit more complicated. It requires the top valve to almost fail completely or completely fail. Why?

Your RV pump is a momentary pump and you know this because you can hear it turn on and off when it reaches maximum PSI. ...But if your check-valve is partially or completely closed, then the **hot water pressure in your tank is fighting with your pump pressure** and when the tank pressure is winning -- then hot water is allowed to enter the cold water line for a certain period of time. Then the line pressure from the pump wins!

This why your shower will run cold for a longer period of time than usual; and then for no reason at all you might have 102F hot water, or you might have very cold water, or you might get nothing but hot water at 140F. And 140F is very hot... maybe not scalding, but it will burn you.

** With a failed Top Tank Check Valve... once a column of pure hot water enters your cold water line, it has nowhere to go but out the cold water side of the shower valve... if you are showering.

CONCLUSIONS

** The hot water tank pressure needs to balance with the cold water pump or line pressure. And when you have a stuck or partially stuck check valve in the TOP of the tank it can't do that.

** And if you have a stuck (closed) check-valve in the bottom of the tank then no water will fill the tank. (Which can create different problems.)

** Check valves are prone to failure and I don't know about you, I hate cold showers, which is the more likely scenario; but I also don't like getting "flushed" with 140F water either.

SOLUTION TO EVERYTHING

The easiest, cheapest, and most RELIABLE SOLUTION is the drill the guts out of those check-valves and re-use them. Problem solved indefinitely!

Note: As part of your RV emergency kit, you should pick up 2 of those rubber donuts (50cents) that go between your hot water plastic fittings and your check-valve-nipple. These often leak and they are very hard to find on the road.

Happy motoring to us all!