

# FREQUENTLY ASKED QUESTIONS:

## What is the History of ShowerStart?

Evolve Technologies' core water and energy saving technology, ShowerStart®, has been commercially available since 2006. The technology initially launched as a standalone thermostatic shut-off valve (TSV) positioned between a showerhead and a shower arm. The product was called ShowerStart.

Subsequently the company developed and launched the second generation of ShowerStart in 2007. This iteration was designed for integration within a showerhead and was launched as a line of showerheads as well as a standalone TSV under a new brand, evolve™. Today all Evolve Technologies' products are sold under the company's evolve brand.

To date more than 750,000 units have been sold. The overwhelming majority have been installed within utility conservation and weatherization programs throughout the U.S.

## What are ShowerStart's applications?

In and of itself, ShowerStart does not restrict showerhead pressure or flow and delivers savings incremental to the efficiencies of low flow showerheads. Rather than reducing flow while showering, ShowerStart saves the energy-filled hot water that's wasted (behavioral waste) during the shower warm-up process. ShowerStart has two distinct applications:

- It can be used as a stand-alone device (ShowerStart TSV) to provide meaningful water and energy savings for people who do not wish to use a low flow showerhead.
- It can be paired with a low flow showerhead to substantially increase its efficiency.

## What's the showering process once the unit is installed?

Showering with the ShowerStart is simple and convenient. Users are able to save water, and the energy used to heat it, without changing their behavior or in-shower experience. Now they can keep their typical routine of undertaking activities while waiting for the shower to become warm without inadvertently wasting hot water once it arrives.

The process of showering with ShowerStart installed is as follows:

- Turn shower on. Once 95F (35C) water arrives, flow is automatically reduced to a trickle.
- Pull the unit's lanyard to bypass the trickle and resume normal showerhead flow.
- Check water temperature and begin showering. The ShowerStart automatically resets for the next shower.

## Does ShowerStart warm the water?

ShowerStart does not warm the water. The hot water heater does the heating and ShowerStart acts as the showerhead's brains by monitoring the water temperature and automatically reducing the flow to a trickle as soon as near-bathing-temperature (95F/35C) water arrives.

# Does ShowerStart increase the risk of scalding?

Evolve Technologies has conducted testing to determine the impact of ShowerStart on water temperatures high enough to quickly scald bathers.

Testing consisted of monitoring, recording and comparing the showering temperatures of a 1.5 gpm WaterSense certified showerhead with and without ShowerStart. The following fixed parameters were used:

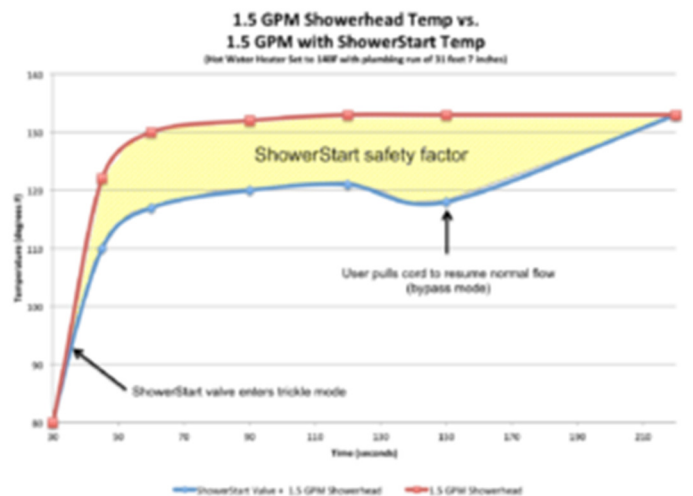
- Water heater set point of 140F
- ½ in. copper plumbing-run of 31 ft. 7 in.
- Ambient air temp of 65F
- Shower turned to full-hot upon start up
- Temps measured 18 in. from showerhead
- User enters shower after 150 sec.

The 31 ft. 7 in. plumbing run was derived from data presented by Oak Ridge National Lab in its 2004 “Evaluation of Residential Hot Water Distribution Systems by Numeric Simulation” paper. The calculation considers cold water purge times for clustered events as well as completely cold draws and assumes a weighting of 10% new construction and 90% existing homes. The run holds 1.67 gallons of water.

Measuring the water-on-body contact temperature 18 in. from the showerhead is consistent with the WaterSense standard for spray coverage testing. As a result, readings were taken from this distance.

Assuming bathers enter the shower after 150 seconds, the presence of ShowerStart lowers the initial water-on-body contact temperature by 15F – it takes an additional 70 seconds for the water to reach 133F (the temp of the water exiting a showerhead without ShowerStart installed). This “safety factor” provides time for users to lower shower temperatures before scalding occurs.

Additionally, the “safety factor” extends the time of exposure before burns will normally develop. At 133F (initial on-body-water temperature without ShowerStart) 2nd and 3rd degree burns develop on adult skin in as little as 30 seconds. With ShowerStart installed these types of burns would normally occur after 5 minutes of exposure.



# Can ShowerStart save the cold water too?

The cold water within the plumbing lines (structural waste) will exit through the showerhead. ShowerStart will reduce the showerhead's flow to a trickle once near-bathing-temperature water (95F/35C) arrives. As a result, it prevents the inadvertent warm and hot water waste associated with people's warm-up routines. It is not a cold water savings device.

# Will ShowerStart work in homes with low water pressures?

The standard version of the ShowerStart TSV is compatible with homes having static water pressures of 30 psi or greater. This water pressure is necessary to ensure the TSV can be taken out of trickle mode by pulling the unit's lanyard once the user is ready to begin showering. As a result, ShowerStart may not be compatible with homes serviced by wells.

More recently a specialized version of the ShowerStart TSV that is capable of operating in static water pressures below 30 psi is available. Please contact Evolve Technologies for additional information on this version of the product.

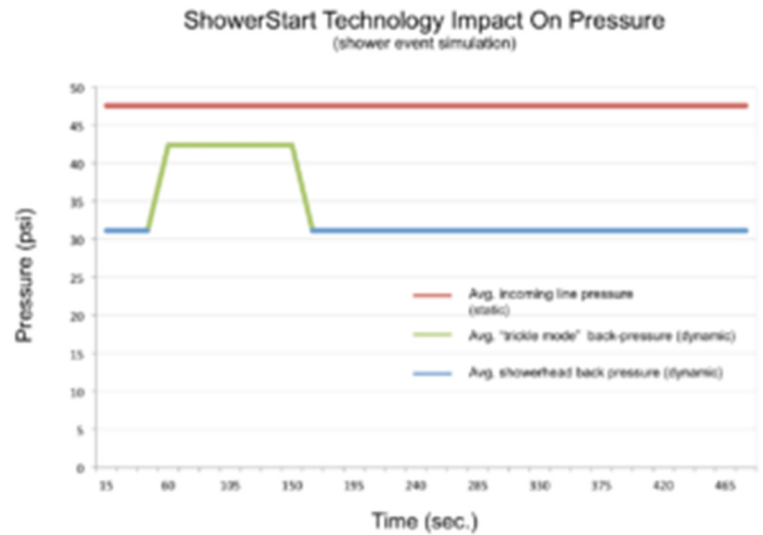
# How does ShowerStart's trickle impact line pressures?

Evolve Technologies has conducted testing to determine the impact of ShowerStart "trickle mode" on pressure within the plumbing line running from the shower's mixing valve to the showerhead. The following fixed parameters were used:

- incoming pressure set to 30, 35, 45 and 80 psi – a different static pressure for each test
- 2.5 gpm, 2.0 gpm, and 1.5 gpm showerhead flow rates were tested – each rate at each psi
- hot water (130 F) exited tank style heater – no cold water mix
- readings taken at showerhead – simulates back-pressure between mixing valve & showerhead
- readings taken with showerhead in both normal flow and "trickle mode"

Testing reveals ShowerStart's "trickle mode" adds, on average, 9.5 – 12.75 psi of back-pressure to the line running from the mixing valve to the showerhead vs. the back-pressure created by a showerhead operating at its normal flow.

In no circumstance does ShowerStart's "trickle mode" create back-pressure greater than the incoming water line pressure and is, on average, 11% lower than that threshold.



## Is ShowerStart compatible with tankless heaters?

The statement indicating ShowerStart is not for use with tankless hot water heaters was included several years ago per the request of a California utility. They requested its inclusion as a means of mitigating a potential customer satisfaction issue relating to the fact that tankless systems require a minimum flow rate to produce hot water and flow drops below this threshold when ShowerStart is in trickle mode. As a result a brief, yet significant, change in the shower's water temperature may occur shortly after resuming the shower's normal flow.

Subsequently, at the request of the utility, Evolve Technologies conducted a survey in November of 2009 to determine the impact of this potential temperature fluctuation on user satisfaction. . 9% (41/475) of the respondents indicated they were using ShowerStart with a tankless hot water heater. Of that group, 10% (4 respondents) referenced a temperature fluctuation when given an opportunity to comment on issues or complaints, yet those respondents gave their Evolve Technologies product a good or excellent overall satisfaction rating. The four also indicated they were likely or very likely to purchase the product again.

The California utility requesting the inclusion of the "NOT for tankless" language has subsequently incentivized home builders such as KB Homes to purchase and install products with ShowerStart in their new builds containing tankless water heating systems.

Additionally it appears as if the potential for a temperature fluctuation is being further mitigated as newer generations of tankless systems with improved recovery times and lower flow rate minimums enter the marketplace.

## Have ShowerStart's savings been validated?

Major utility companies have written engineering work papers and conducted pilot field studies on ShowerStart and now use it in their largest income qualified and market rate conservation programs. We encourage you to review their information as well as our quantification of behavioral waste derived from data captured by Lawrence Berkeley National Labs. [LEARN MORE](#)

# Has ShowerStart been certified?

ShowerStart's ability to reduce behavioral waste is unique and a new International Association of Plumbing and Mechanical Officials (IAPMO) standard was created to cover its functionality – IAPMO IGC 244-2007a. In addition to meeting IAPMO requirements and being Uniform Plumbing Code (UPC) certified, all showerheads containing ShowerStart have also been WaterSense certified.

# How long will ShowerStart last?

ShowerStart has received UPC certification under the IAPMO IGC 244-2007a standard. A critical portion of the standard includes a lifecycle test consisting of 10,000 cycles with out fail. One cycle consists of the following steps (a) through (d).

- a) Flow water at an inlet pressure of  $80 \pm 1$  psi and at a temperature of less than  $87.8^{\circ}\text{F}$  ( $31.0^{\circ}\text{C}$ ) for one minute. Device will be in an open flowing condition.
- b) Gradually increase the water temperature to  $98.6^{\circ}\text{F}$  ( $37.0^{\circ}\text{C}$ ). The device shall close such that the flow of water is less than 0.2 gpm but not less than 0.05 gpm.
- c) Manually open the device to the maximum flow condition (2.5 gpm maximum at  $80 \pm 1$  psi) by turning the manual open lever by hand.
- d) Shutoff water pressure to zero (0.0 psi) at the device inlet to automatically reset the device.

10,000 cycles is equivalent to 3 users showering daily for more than 9 years.

# Is ShowerStart Patented?

ShowerStart is protected by multiple U.S. and International Patents and Patents Pending.