

WQA Batelle Study on Energy Efficiency Benefit of Water Softeners

The full report of the Batelle study on energy efficiency benefit of water softeners is now available on the WQA website: <http://www.wqa.org/BattelleReport>. Batelle is an independent testing organization and the study was funded by the WQRF at a cost of over \$700,000.

As a consequence of this study, the WQA is now promoting water softeners as:

“The best energy saving device you can buy”

The efficiency benefit will focus on 10% over 2 years but the actual saving may be higher or lower depending on water hardness, type of water heater and water usage.

1. Testing involved 10 gas storage heater, 10 gas instantaneous water heater and 10 electric storage heaters (N.B. for hot water only – **not central heating**), 5 of each on hard (26 grains, 400 ppm) and 5 on softened water.
2. 10 low flow shower heads, 10 faucets, 6 dishwashers and 6 laundry machines were also tested on hard and softened water.
3. The trial was designed to simulate up to 15 years operation using acceleration factors.
4. All of the water heaters on softened water maintained their original efficiency throughout the testing and all the showerheads, faucets, dishwashers and laundry machines remained clean on softened water.
5. On hard water:
 - a. The gas instantaneous water heaters dropped in thermal efficiency by 8 % over a simulated 1.6 years – but fouled to the point where flow could not be maintained. They were therefore descaled regularly throughout the testing. However the original efficiency was not restored after descaling. Softener payback time due to energy and descaling costs was forecast to be 1 year.
 - b. The gas storage heaters dropped in efficiency by 3% over 2 years equivalent service with a predicted drop of 14% (70% down to 56%) over 10 years.
 - c. The electric storage heater maintained their efficiency throughout the test because the elements were totally submerged and most of the scale fell to the bottom of the tank. However, due to the high operating temperature of the scaled elements, the total amount of scale formed was nearly double that of the gas storage heater and the elements were predicted to fail prematurely.
 - d. The shower heads plugged almost completely in the equivalent of 16 months
 - e. The faucets blocked after 19 days of testing.
 - f. The dishwashers and laundry machines were all heavily fouled.
 - g. All appliances were visually heavily fouled (quality of life and cleaning cost impact)
6. WQA is pursuing Energy Star marking for softeners.
7. A study on soap/detergent savings is expected to be completed later this year. Effects on fabric and laundry are included.
8. In the US, water heater some manufacturers (Norit, Renae) void their warranty if there is scale evident in a failed heater or if the water hardness is above a specified level.