

Battelle Benefits

Comprehensive study proves efficiency benefits of softened water

By Rebecca Wilhelm

Now that the results are in, what will you do with them? At the recent WQA Aquatech USA 2010 tradeshow in Orlando, one of the most packed events was the Keynote address, "How to Effectively Market the Softened Water Energy Efficiency Study," which featured a panel discussion and audience participation covering the best ways to use the information from the recently completed Battelle Study.

The Battelle Study began in 2009 when the Water Quality Research Foundation (WQRF), the research arm of the Water Quality Assn. (WQA), contracted the services of the Battelle Memorial Institute in Columbus, Ohio, to examine how much energy savings household water softeners can provide.

The study and its results have provided the industry with an independent, scientifically based endorsement, confirming that water softeners increase energy efficiency and extend the life of

household appliances and fixtures.

"We have known from studies done in the 1980s that softened water will save energy in heating water," said Joe Harrison, P.E., CWS-VI, technical director for the WQA. "Now the Department of Energy says that heating water accounts for 14% to 25% of the energy consumed in your home. The Water Quality Research Foundation (WQRF) wanted to update the data on energy savings with softened water in modern water

heaters and the new instantaneous tankless water heaters."

This article will discuss the basic findings of the study and various strategies for maximizing its marketing potential.

Scope

The independent institute developed and carried out tests evaluating the cost and energy use associated with heating hard water versus softened water.

Over a period of nine months, accelerated scale tests were carried out to simulate twelve years of use.

The project also examined the subsequent effect of hard water on the performance capabilities of fixtures and appliances such as faucets, low-flow showerheads, dishwashers and clothes washers.

With the data gathered from the water heater efficiency tests and fixture performance tests, the institute developed a differential carbon footprint



Left: Showerhead 10 on seventh day of testing with hard well water.
Right: Showerhead 4 on seventh day of testing with soft well water.



assessment for homes that use softened water versus homes that use unsoftened water.

Water Heaters

Testing: Tests comparing efficiency of hard versus softened water in water heaters included 10 units each of gas, electric and tankless water heaters. Five of each kind were tested with a water softener, and five of each kind were tested without a water softener.

Thermal efficiency was calculated by measuring the inlet and outlet temperature at 15-second intervals, measuring the amount of hot water and measuring the amount of energy required to produce the hot water. The thermal efficiency was measured at the beginning of the study and at one-week intervals in order to track any change in efficiency as scale built up.

Results: For all water heaters on soft water, "efficiency remained essentially constant over the duration of the testing," according to the study.

None of the water heaters on unsoftened water lasted until the end of the test—the outlet piping (½-in. copper pipe, a needle valve and solenoid valve—were blocked with scale buildup).

The average rate of scale buildup in the gas storage water heaters on unsoftened water was 528 grams per year, compared to 7 grams per year on softened water. The average rate of scale buildup in the electric storage water heaters was 907 grams per year on unsoftened water, compared to 14 grams per year on softened water.

Fixtures & Appliances

Low-Flow Showerheads: Five low-flow showerheads were tested on unsoftened water and five were tested on softened water. The showerheads on softened water performed well throughout testing, while the showerheads on unsoftened water clogged after an average of 3,203 gal of flow.

Low-Flow Faucets: Ten low-flow faucets were also installed, five tested on softened water and five tested on unsoftened water. Again, the fixtures on soft water performed well, while the faucets on unsoftened water clogged after the equivalent of 19 days of flow, estimating an average household water usage of 50 gal of hot water per day.

Dishwashers and Clothes Washers: To test the effect of unsoftened water on the performance of these household appliances, six KitchenAid dishwashers and General Electric clothes washers were purchased. After 30 days of testing and 240 wash cycles, the appliances using unsoftened water had

"noticeable scale buildup," according to the report, while the units using soft water looked like "they could be cleaned up to look like new with just a quick wipe down."

Carbon Footprint

Battelle determined the carbon

footprint of the water heaters by examining energy consumption within the home and the resulting greenhouse gas emissions. They found that where there are energy efficiency differences between the equipment, there were also carbon footprint differences.

For a storage-type gas water heater, there was a 14.8% carbon footprint reduction over a 15-year service life with softened water, taking into account the natural gas used for heating the water as well as electricity used for water softening. For instantaneous water heaters, there was a carbon

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Now What?

The importance of the information from the Battelle Study is that it provides hard data from an objective, independent organization that speaks to both legislators and consumers. Legislators have told the water softening industry to focus on numbers, not “soft benefits,” and the Battelle study does just that. Utilizing this information well also is an effective way to address energy efficiency, a top consumer concern.

The presentation on marketing the study at WQA Aquatech USA 2010 emphasized the importance of the

industry speaking with a single voice when presenting the information from the study. This provides a consistent message and lends authority to the presentation, rather than co-opting the best statistics and using them for brand promotion or petty attacks on the competition.

WQA members will have access to marketing materials with the study results that are most relevant to consumers. Consumer outreach will be done through the WQA website, media blasts and various educational materials provided to WQA retail members, dealers and manufacturers and suppliers. WQRF ads are available for members and business imprint and print-on-demand sell sheets will be available.

“We feel with the Battelle Study results that water softeners can rightfully be positioned as one of the very highest energy-saving and best ‘green’ technology appliances that a homeowner can own,” Harrison concluded.

Legislative packets with the complete study will be ready to give to regulators, lobbyists and government officials, describing the benefits of hardness removal through ion exchange.

What are the most important takeaways from the data? The WQA suggests an acronym to get across the most important points of the message: “FEEL the Benefits of Soft Water:”

- **Function:** No clogged faucets;
- **Efficiency:** Appliances are more energy-efficient;
- **Extended Life:** Appliances and plumbing last longer; and
- **Look:** Fixtures and appliances won't tarnish or stain.

◀ The study demonstrated that higher water hardness leads to higher energy consumption, and higher energy costs, without the use of a water softener.



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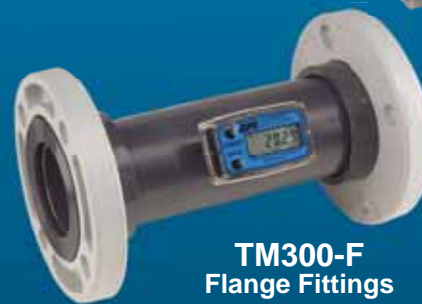
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On the Horizon

More research projects are on the agenda for the WQRF.

"We are now conducting a laundry and dishwashing study regarding the effects of softened water relative to cleaning, soap and detergent usage and water temperatures," Harrison said, "to be completed in 2011."

Future studies may examine cation ratio effects on septic tank performance, which may address regulator concerns about water softener discharges to septic tank wastewater systems, as well as treated drinking water in place of sugary drinks, which may tie into the issue of lowering obesity levels in children. *wqp*

Editor's Note:

The full text of the report, *Study on Benefits of Removal of Water Hardness (Calcium and Magnesium Ions)* From a

Water Supply, can be found online at www.wqa.org/battellereport.

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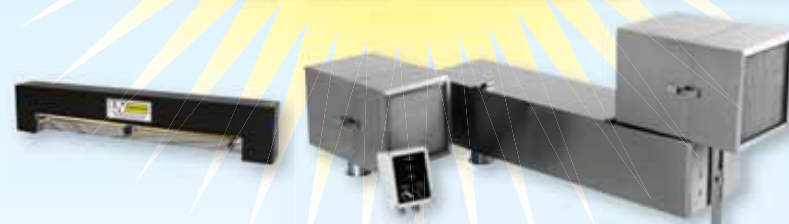
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