



# Water Softening—another life enhancing benefit of salt

Research findings

Health benefits

Economic benefits

Environmental benefits



# What is water softening?

Water softening is the process of removing damaging hardness minerals (calcium, magnesium)

If not removed, these hardness minerals are injurious to health; they are destructive to property and they contribute an excessive burden on the environment.



## Salt-based water softeners are the key

Hard water can be found in nearly 90 percent of American homes.

These minerals cause scaling, a buildup that clogs waterlines and plumbing.

Researchers at the School of Sustainable Engineering at Arizona State University found bacteria may grow in pipes filled with both hard scale and soft scale at the same rate. This is important new information because some forms of water conditioning, which do not use salt, produce this soft scale. The way to remove both hard and soft scale in household water systems is with salt-based water softeners.



**If hard water does this to your dishwasher . . .**



**What does it do to your skin, hair and clothes?**

**What does it do to your skin, hair and clothes?**



# What are the specific benefits to consumers?

A primary benefit to consumers is enhanced health, starting with improved skin health.

Skin is the largest functional organ in human physiology - it is our original body armor.

It protect us from environmental challenges including pathogenic microorganisms.

Good cosmetic health is more than skin-deep –much more than good-looking skin and silky hair. (Although softer skin and hair is a pretty nice perk of water softening)



# What are the specific benefits to consumers?

Softened water prevents the formation of all types of scale in plumbing systems

**Both hard and soft scale** that is associated with plumbing, faucets and showerheads ***can support the growth of harmful pathogenic organisms*** such as legionnaires disease<sup>‡</sup>

This, in turn, exposes consumers to these opportunistic microbial threats

Through its ability to remove hardness minerals, ***softened water greatly reduces the risks of personal exposure to these challenges.***

# Health

<sup>‡</sup> Impact of Scale Formation on Biofilm Growth in Premise Plumbing, Dr. Peter Fox, Arizona State University - **SI Funded**



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# What is that worth to consumers?

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## SALT INSTITUTE PRESS RELEASES AND STATEMENTS

### HARD WATER SCALING LINKED TO BACTERIAL GROWTH IN HOMES

by [The Salt Institute](#) - January 6, 2014

**Press Release**

Alexandria, VA— New research by the School of Sustainable Engineering at Arizona State University has found that the hard water scaling normally found in the pipes of homes is an active environment for harmful bacterial growth. According to The U.S. Geological Survey nearly 90 percent of American homes have hard water – water containing high levels of calcium and magnesium.

The piping used in home plumbing, whether it is copper or PVC, has very smooth interior surfaces which don't permit bacteria to settle and grow. However, over time, hard water results in scale formation on the interior surfaces of those pipes and that provides a perfect home for bacteria. This can significantly increase exposure to pathogenic bacteria such as Legionella, which can cause Legionnaire's disease.

The Arizona State University researchers found that the problem is not limited to hard scale formations. Soft scale, which is created with some forms of water conditioning, showed a similar effect to support the growth of microbial films in the research.

The growth of biofilms depends on a variety of factors such as water flow rates as well as the type of pipe material. When pathogenic microbes inhabit these biofilms, home plumbing systems can become a direct line of contact with humans. Colonization of plumbing systems is especially a concern in hospital buildings and for

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Showerheads in your home can harbor highly infectious bacteria and fungi, according to a new study.

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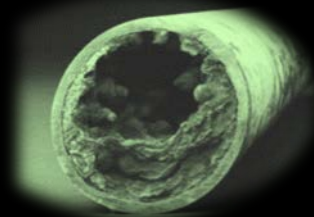
# Health



# What are the other benefits to consumers?

Another major benefit of softened water to consumers is economic--  
more money left in the consumer's pocket

- Better cleaning result (clothes and dishwashers) with ***less soap/detergent\****
- Better cleaning result (clothes and dishwashers) with ***lower water temperatures\****
- No scaling of heating elements leading to ***much longer working life and lower energy costs for appliances*** (clothes and dishwashers, hot water heaters)\*
- No scaling of plumbing resulting in higher ***more reliable water pressure and fewer service calls.\****



## Economic

\*SI Supported Battelle Memorial Institute.  
Study on Benefits of Removal of Water  
Hardness (Calcium & Magnesium Ions) From  
a Water Supply. (2009, 2013)



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## WATER NEWS & ARTICLES

### HARD WATER: BAD FOR YOUR HOME AND WALLET

by [The Salt Institute](#) - October 1, 2013

#### Hard water: bad for your home and wallet

Nearly 90 percent of American homes have hard water – water containing high levels of calcium and magnesium, according to The U.S. Geological Survey. The hardest water is commonly found in the states that run from Kansas to Texas as well as in Southern California. Hard water on its own is bad enough, making it difficult to wash clothes and dishes and leaving scaling on your pipes and showerheads as well as nasty brown rings in your sinks and toilets. However, it is also costing you money.

Research by the Battelle Institute found that with hard water, showerheads lost 75 percent of their flow rate in less than 18 simulated months and could not maintain the required flow rate because of scaling.

Water heaters are also negatively affected by hard water. When using softened water, researchers found that all the water heaters tested maintained 100 percent efficiency over a simulated 15-year lifetime, but with hard water, the gas and electric heater efficiency dropped by 25 percent – an incredible loss in energy resulting in significantly higher costs. In the case of the new instant tankless water heaters, hard water caused them to completely fail to function because of plugged-up scale, or mineral build-up associated with hard water, after only 1.6 years of simulated use – about a tenth the normal life of the appliance.

Another study conducted for the Water Quality Research Foundation assessed the impact of water hardness on automatic dishwashers. Soft water was up to 12 times more effective at cleaning dishes than increasing the amount of detergent used. Researchers also found that for washing machines the most important factor in removing stains was water softness. Reduction of water hardness was up to 100 times more effective at stain removal than increasing the detergent dose or washing with hotter water.

You can take steps to eliminate the source of the scaling with a salt-based water softener. In order to make hard water into soft water, you have to remove the calcium and magnesium. The only way to do that effectively is with a salt-regenerated water softener. These work by running the incoming hard water through a resin filter that uses the calcium and magnesium in the water to replace sodium ions on the resin.

As the resin becomes saturated with calcium and magnesium, it releases them into the water and picks up sodium ions from the salt. The resin then releases the sodium ions into the water and picks up calcium and magnesium ions from the water. The resin then releases the sodium ions into the water and picks up calcium and magnesium ions from the water. The resin then releases the sodium ions into the water and picks up calcium and magnesium ions from the water.

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## WATER NEWS & ARTICLES

### LAUNDRY TIP: HOW TO HAVE WHITER WHITES, LOWER BILLS AND A SMALLER CARBON FOOTPRINT

by [The Salt Institute](#) - July 13, 2013



(BPT) – (ARA) – If you do your own laundry, pay for detergent, or simply like clean clothes, here is a quick quiz. What is the most important factor in removing stains?

- a. – Amount of detergent.
- b. – Water temperature.
- c. – Water softness.

If you said, "c, water softness," congratulations. You know your laundry, and perhaps your water. Reduction of water hardness was up to 100 times more effective at stain removal than increasing detergent dose or

washing with hotter water, according to a March 2011 study by Scientific Services S/D on behalf of the Water Quality Research Foundation.

Everyone has seen ads touting the cleaning power of this or that detergent, but many don't realize that dissolved mineral count in their water has a much greater effect. Water with a high mineral count, particularly calcium and magnesium, is called "hard," and is prevalent in most of the United States. "Soft" water has a lower mineral count.

Researchers found that if you soften your water, you can use half the detergent and switch from hot to cold water and still get better stain removal," says Paul Undesser, director of regulatory and public affairs for the Water Quality Association. "In other words, softened water gives you cleaner clothes, lower energy bills, lower detergent costs, and less money and reducing your carbon footprint."

Water softeners, which use salt-regenerated water softeners, the most popular and effective type, are recommended by the Water Quality Association. Undesser says the Water Quality Association considers water softeners a more effective and efficient way to clean clothes than water softeners.

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## Learn about this home improvement that can save you money



(BPT) - For many homeowners the biggest utility bill is electricity. Heating and cooling the home makes up nearly half of electricity costs, but the next biggest source is the water heater. Water heaters can account for up to 25 percent of total household energy use. Taking steps to improve the energy efficiency of a home with better insulation and more efficient furnaces and air

conditioners can reduce energy costs significantly, as can making sure water heaters are operating properly.

However, purchasing a high efficiency water heater does little good if the environment in which it operates is not right. The main culprit in reducing the efficiency of water heaters is hard water. Nearly 90 percent of American homes have hard water which contains high levels of calcium and magnesium. These minerals cause scaling, a buildup that clogs waterlines and plumbing forcing appliances to work harder and operate less efficiently. Hard water can reduce the efficiency of water heaters and increase electricity costs by as much as 48 percent according to the Battelle Memorial Institute.

# Economic



# Are there any other benefits to consumers?

Environmental benefit due to increased energy efficiency of appliances and heating tanks (also a money-saving bonus)\*

Longer life of appliances translates directly into less pressure on environment (no need to replace and dump old appliances in landfills)\*

Softened water improves operation of rural septic systems\*\*

Requires less soap and detergent runoff to be sent to the environment

\*SI Supported Battelle Memorial Institute. Study on Benefits of Removal of Water Hardness (Calcium & Magnesium Ions) From a Water Supply. (2009, 2013)

\*\*SI Support Battelle Memorial Institute. Changes in Septic Tank Effluent Due to Water Softener Use. (2013)

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**The Oakland Tribune**

## Save money and help the environment by checking on your water quality

ARA  
Bruce Farrar didn't like what hard water was doing to his home.

"Our dishes in the dishwasher were terrible," says Farrar, who lives in Newport Beach, Calif. "The inside of the dishwasher was just covered with calcium. Also, our showers had glass doors and I had to put a special cleaner on them because of the calcium buildup."


But the problems didn't end there. Hard water was also preventing the family's clothes washer from functioning properly, requiring the use of more soap and hotter water, which increased Farrar's grocery bill and energy costs. The added energy needs were also putting more wear and tear on his hot water heater, decreasing its lifespan.

Nearly 90 percent of American homes have hard water containing high levels

diagnosed by a water quality professional. The Water Quality Association has several resources on its website to help you locate a reputable company, and many offer this service for free.

In order to make hard water into soft water, you have to remove the calcium and magnesium and the only way to do that effectively is with a salt-regenerated water softener. These work by running the incoming hard water through a resin filter that traps the calcium and magnesium in the water, as well as any iron, manganese or radium ions by replacing them with sodium ions, which must be occasionally recharged.

There are other products that claim to condition water using an electro-magnetic charge instead of salt ions, but they do not really soften water. These devices cause the hard minerals in the water to attract and form



subjected to hard water which lose almost half their efficiency over the same time period.

With ever-increasing household and energy costs facing American consumers, many are looking for ways to save money. A water softener that helps homeowners use less energy not only saves money, but also benefits the environment by allowing you to use fewer fossil fuels.

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# Environment



# What does water conditioning mean to consumers?

## Health

Skin and hair health  
Protection from  
bacteria

## Economic

Consistent savings in  
personal finances

## Environment

Leaving the world a  
better place for future  
generations to come



Lori Roman  
President  
Salt Institute