

# Water Review

Consumer Report

A Publication of the Water Quality Research Council

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## Soft Water: The Economical Solution

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down on the amount required for use. Unfortunately, hardness minerals combine with soap to produce an insoluble "curd" which can remain as a residue on washed laundry. This is similar to the difficult-to-clean residue found on bathroom tubs, sinks, and tile in hard water areas.

Hardness also tends to counteract soap's alkalinity which reduces its cleaning ability and requires the use of more soap to get laundry clean. A partial

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## Soft Water—The Economical Solution

(Continued from other side)

detergent, which reduces cleaning ability and hampers the rinse, means hotter water and extra rinse cycles may be required. The energy used to heat water and operate the washing machine for the extra cycles is a wasted expense.

**Fabric Life and Appearance**—A Purdue University study found that fabrics washed in hard water tend to wear out up to 15 percent quicker than fabrics washed in soft water. This is probably due to the presence of hardness residues in the fabric making it stiffer and causing increased friction and wear on the fabric as it flexes.

The Purdue study also found that hard water has a generally negative effect on colors and whites. Colors were found to fade and whites to darken more quickly in hard water. In addition, the study found that laundry washed in hard water became resoiled with greater ease.

**Washing Machines**—The dissolved minerals in hard water tend to collect in water-using appliances shortening their life. Washing machines are not immune to this process, and the build-up of these minerals can clog pipes and cause excessive wear on moving parts. As a result, a study reported by the American Water Works Association found that washing machines used with hard water can wear out up to 30 percent quicker. That means a washer, which might otherwise last ten years, will likely last seven years where hard water deposits can be formed.

### Solutions

The best solution to these hard water problems is to use soft water. This was realized by earlier generations who termed the phrase "hard water" because they found it hard to wash with. They collected soft rainwater in a barrel to be used in laundering, which is hardly an option in the modern world of indoor plumbing and automatic washing machines.

Some water utilities offer municipal softening, but water treated in this manner falls short of being soft water. Municipal treatment is generally done in areas with extremely hard water, and the end water is still often in the hard to moderately hard range. Municipal softening is also inefficient because all of the community's water is softened, including

water that is ultimately used to water lawns and clean public streets. Therefore, household water softeners generally provide the most economically effective source of soft water for home and business use.

A typical water softener works on the principal of "cation exchange" in which the ions of hardness minerals (an ion is an electrically charged atom or group of atoms) are exchanged for sodium ions, effectively reducing the concentration of hardness minerals to insignificant levels.

As the water enters the softener, it passes over a resin bed in a special tank. The resin is made up of tiny beads of styrene and divinylbenzene which attract and hold sodium or potassium ions. The beads will exchange these ions whenever the bead encounters another ion such as calcium or magnesium. The beads are biologically safe and approved for use by the U.S. Food and Drug Administration (FDA).

After a period of use, the sodium or potassium ions are completely exchanged and the unit has to be "backwashed" or "regenerated," which recharges the resin beads with sodium or potassium ions. This requires the use of sodium or potassium chloride which is loaded into a "brine tank" where salt dissolves in water forming a brine used to recharge the system.

The recharging is generally done by one of two common methods. Automatic softeners initiate the process on a set time cycle according to anticipated need, or the Demand Initiated Regeneration (DIR) process which uses a meter or sensor to monitor the actual hardness levels or the amount of water the unit has processed.

A note for people concerned about the presence of sodium ions in their water: Use of sodium ions does not make the water noticeably salty or cause a significant increase in a person's sodium intake.

A person who drinks eight 12-ounce glasses of water per day softened from 20 gpg takes in less than ten percent of their typical dietary sodium intake from this source. In fact, the FDA defines water that would result from softening 100 gpg hard water (where many more sodium ions would have to be exchanged than is typically the case) as a "low sodium" beverage. This level of sodium should only affect individuals on a

significantly restricted diet; anyone who feels they fall into this category should consult their doctor.

### Conclusion

The waste hard water creates each year can cost hundreds of dollars in extra detergent use, unnecessary rinse cycles and hot water use, fabrics that lose their usefulness, and washing machines that wear out before their time. Soft water greatly reduces this waste and gets laundry cleaner as well. And these benefits are just in laundry expenses.

Many of softened water's benefits apply to other areas of the home or business as well. Bathroom and kitchen cleaning is made easier without the formation of soap curd, water heaters operate more efficiently and last longer, dishes get cleaner with less detergent and dishwashers last longer, and even bathing is free of the hard water deposits which dry out skin and dull hair. When it all adds up, hard water is a waste that can be done without.

For more information on the benefits of water softening, contact your local Certified Water Specialist (CWS), Water Quality Association member company, or write to:

**Water Quality Association**  
Post Office Box 606  
Lisle, Illinois 60532 □

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