

Water Softeners

Hard water and water softeners

Hard water is water that has a high mineral content whereas soft water is low in minerals. In some areas, water is “hardened” as it passes through limestone and chalk, picking up



Mineral buildup inside a water pipe

abundant inorganic molecules like calcium and magnesium. These molecules cause soaps and detergents to be less effective by hindering lathering and rinsing, leading to water spots on dishes. They also form scum and scaly buildup in pipes causing clogs and in machines that process water like humidifiers and coffee makers. To remedy hard water, some homeowners and water treatment plants install water softeners, which remove the inorganic compounds.

Hard water isn't toxic, so installing a softener is a personal choice, but one that can increase the life of household appliances, maintain clearer pipes, keep dishes looking cleaner, and save consumers money on soaps and detergents.

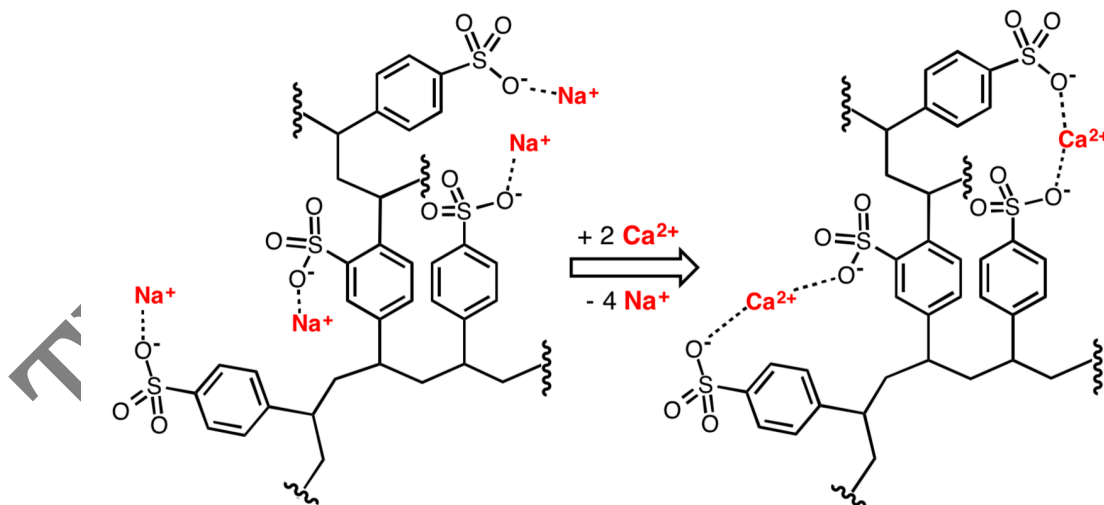


Image of the Na⁺/Ca²⁺- exchange inside a water softener

How do water softeners work?

There are two types of water softeners, **household** and **central** (used by water treatment plants).

Household:

Ecobottle Sample



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Polystyrene (resin) beads

Central: Industrial water softeners consist of a single tank, which contains sand and a chemical, usually caustic soda (a sodium compound: sodium hydroxide). Hard water enters at the bottom of the tank and is mixed with the chemical, allowing calcium carbonate to attach to sand grains. These calcium carbonate covered sand grains build up like snowballs, eventually becoming so large and heavy that they fall to the bottom of the tank and are removed and replaced by new sand grains. Softened water leaves from the top of the tank. Resulting calcium carbonate sand pellets can be used in agriculture, thus reducing waste. This process also reduces the solubility of lead and copper, keeping them out of the water supply.

How do you know if your water is hard?

Generally speaking, if your soap isn't lathering well (forms bubbles easily) you might have hard water. You may also notice water stains on dishes and a mineral (usually whitish) buildup inside certain appliances that process a lot of water. In the case of humidifiers, the minerals will build up on the heating element until the machine stops working. If this occurs, a simple fix is to let it soak in vinegar overnight then scrub it with a bristle pad.



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Number of soap drops until suds appear	Classification
10	Soft
20	Slightly hard
30	Moderately hard
40	Hard
50	Very hard

Some concerns

As a result of the softening process, water softeners increase the sodium concentration in the home's drinking water. This can be dangerous for those who have high blood pressure (hypertensive) and who have been placed on low sodium diets. However, for healthy individuals, the added salt poses little or no health risk.

Reading Comprehension Questions:

1. What is "hard" water?
2. How
3. How does hard water affect someone who has it in his or her home?
4. How
5. How
6. If you did the "suds" test and needed to add 40 drops of soap to see bubbles, how would your water be classified?
7. What

Access the video via the URL or QR code below to answer questions 8-12.



<https://goo.gl/2i9Eqc>

8. What
9. What

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TWF SAMPLE A

References

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