
FACT SHEET

Hardness

What Is Water Hardness?

The hardness of water is a measure of the amount of minerals, primarily calcium and magnesium, it contains. Water softening, which removes these minerals from the water may be desirable if large quantities of detergent are needed to produce a lather when doing laundry or scale is present on the interior of piping, laundry sinks or cooking utensils.

Water that contains more than 200 mg/L (milligrams/liter) or 200 ppm (parts per million) as calcium carbonate (CaCO_3), or 12 grains per gallon, is considered to be hard. This may cause plumbing and laundry staining problems. Methods used to soften hard water for home use are softening and reverse osmosis.

Zeolite softening (ion exchange/water softeners)

This process depends on the ability of granular materials called zeolites to exchange ions present in their structure for ions present in the water. As the hard water moves through the zeolite bed, the calcium and magnesium ions in the water are exchanged for sodium ions in the bed, making the water soft. The calcium and magnesium ions are left attached to the zeolite grains. When the exchange capacity of the zeolite is exhausted, it can be regenerated by passing a strong salt (sodium chloride) solution through it. The excess sodium in the solution causes the zeolite to give up the calcium and magnesium ions and take up a new supply of sodium ions. The wash water is then flushed out and the unit is ready to resume the softening process.

The softening-regeneration cycle can be repeated almost indefinitely over many years of service. Zeolite softeners usually consist of two tanks: one containing the zeolite and another, called the brine tank, containing a strong salt solution. Most of these tank type softeners use a timer or a sensing device to start the regenerating process automatically. Usually, the only maintenance required of the homeowner is to add salt and water to the brine tank.

These softening systems, if properly maintained can be used for a long period of time. Homeowners should be aware that only calcium, magnesium and small amounts of iron will be removed from the water. People on salt restricted diets may not be able to drink or cook with this water, or consult their doctor before doing so.

Reverse Osmosis

These units remove water hardness through a straining action. The hard water enters the unit under normal tap pressure and passes through a special membrane. The membrane allows water molecules and only trace levels of contaminants to pass through it. Hardness ions and other contaminants remain on the pressure side of the membrane and are eventually flushed away as waste. Most of these units are equipped with an activated carbon filter that removes the chlorine and generally improves the taste of the water. Reverse osmosis units require very little maintenance. The membrane will need to be changed depending on manufacturer recommendations and the water quality in your area.

Water treated by reverse osmosis does not adversely affect people on sodium restricted diets. Reverse osmosis units are slow and produce more waste water. A little more than one gallon of potable water is produced every six hours. Four to six gallons of waste water are generated in that time. High pressure (and the associated electrical energy costs) is required to operate the unit.

What Is the Hardness of My Water?

In Rockford, the water is very hard. When you purchase a water softener, it is helpful to know what the hardness levels are in your neighborhood.

If you live west of the Rock River, the hardness is 18 – 20 grains per gallon.

If you live east of the Rock River, and West of Fairview Blvd, the hardness is 21-25 grains per gallon.

If you live east of Fairview Blvd. to the City limits, the hardness is 17-19 grains per gallon.