



Suburban Property Inspections

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HARDNESS FACT SHEET

Brief Overview:

Category: Inorganic
Acceptable Level: None published by EPA
Source: Minerals dissolved in water.
Effect: Mineral deposits in plumbing, reduced soap lathering.
Follow up: Treat, retest for hardness.
Treatment: Ion exchange water softener

Details:

Source:

Hardness minerals are completely dissolved in the water and cannot be seen. When rainwater falls over the land and percolates through rocks, it dissolves minerals and holds them in solution. Calcium and magnesium dissolved in water are the two most common minerals that make water "hard". The degree of hardness becomes greater as the calcium and magnesium content increases and is related to the concentration of multivalent cations dissolved in the water.

Effect:

Hardness of the water is not generally considered to be a health-related concern; in fact, calcium and magnesium are essential minerals in a healthy diet. However, hardness can be an aesthetic or economic concern. Hard water can cause problems such as reduced lathering of soaps, scum on wash water, gray laundry, buildup of scale on plumbing elements, reduced water flow due to scale buildup (primarily in water heating systems) and/or scaling on pots and pans.

Hard water interferes with almost every cleaning task from laundering and dishwashing to bathing and personal grooming. Clothes laundered in hard water may look dingy and feel harsh and scratchy. Dishes and glasses may be spotted when dry. Hard water may cause a film on glass shower doors, shower walls, bathtubs, sinks, faucets, etc. Hair washed in hard water may feel sticky and look dull. The amount of hardness minerals in water affects the amount of soap and detergent necessary for cleaning.

Hard water also contributes to inefficient and costly operation of water-using appliances. Heated hard water forms a scale of calcium and magnesium minerals that can contribute to the inefficient operation or failure of water using appliances. Pipes can become clogged with scale that reduces water flow and ultimately requires pipe replacement.

Water Description	CaCO ₃ (mg/L) Grains per Gallon
Soft:	0 to 60 0 to 3
Moderately hard:	61 to 120 3 to 6
Hard:	121 to 180 6 to 10
Very hard:	180 + 10 +

Follow up:

If you find that hardness in the water is a nuisance, you may decide to treat the water to reduce the amount of calcium and magnesium. After installing the treatment equipment, retest to determine whether the unit is softening the water adequately.

Treatment:

The most common method to treat hard water is through an ion exchange water softener. Ion exchange water softening is a process in which the hardness ions, magnesium and calcium, are exchanged with either sodium or occasionally, potassium ions. Hardness minerals are removed from water by passing through a bed of synthetic plastic beads called "resin". This resin has the ability to attract and hold the hardness minerals from the water, much like a magnet attracts metal filings. The process technically is called "ion exchange". When the hardness minerals attach themselves to the beads, the sodium ions are displaced. Hence, the hardness ions are replaced by the sodium ions.

Salt brine has the ability to remove the accumulated hardness minerals from the resin beads. Removal is called "regeneration" or "recharging". A water softener provides a resin bed and a method of passing salt brine through the bed for regeneration. The more resin contained in the softener, the greater is its ability to attract and hold more grains of hardness minerals before regeneration is necessary.

For further technical assistance, call Suburban Property Inspections at 1-866-866-6700, or call the U. S. Environmental Protection Agency Safe Drinking Water Hotline at 1-800-426-4791.



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