Water Softeners

NONCOMMUNITY PUBLIC WATER SUPPLY PROGRAM

Water softeners are a common water treatment device at noncommunity public water systems. They are effective for removing water hardness. The benefits of soft water include an increased efficiency for soaps and detergents and a reduction in mineral deposits. Like all water system components, water softeners must be installed and maintained properly in order to operate effectively. Improper installation and/or maintenance can lead to poor water quality and potential health risks from microbiological contamination.

What is water hardness and how do water softeners work?

Air gap in softener backwash drain line

Water hardness is primarily a measure of the concentration of dissolved calcium and magnesium ions in water. Softeners remove calcium, magnesium, and to a lesser extent iron. Since the typical softener is not designed to remove iron, excessive amounts of iron in the water may foul the system. In this situation, use of an iron removal additive would be advisable. As water flows through a softener's resin bed, hardness related ions come in contact with resin beads saturated with sodium ions. Hardness ions attach to the resin beads and sodium ions are released into the water; this is the ion exchange process. Over time, the resin bed starts to become saturated with hardness related ions. Resin bed regeneration becomes necessary to replenish the resin beads with a fresh supply of sodium ions in order to maintain ion exchange (i.e. softening) capacity. Regeneration is accomplished through several steps that include backwashing, a brine rinse (from the softener salt) and rinse steps.

Are there health concerns with consuming softened water?

For most people, drinking softened water poses no known health hazard. The extra amount of sodium consumed is typically insignificant relative to the total amount of sodium consumed through a normal diet. An individual on a medically restricted sodium diet should however consult with their physician if they plan on regularly consuming softened water.

Septic System Concerns

During resin bed regeneration, backwash and rinse water must be disposed of. Disposal is often into a subsurface sewage treatment system (SSTS). This added wastewater could potentially overload a SSTS if the system was undersized or nearing the end of its useful life due to age or other factors.

Allowable disposal options for softener wastewater include discharging to a properly sized SSTS, onto the ground surface, to a municipal sewer if available, or into the soil. Softener wastewater must be properly managed and cannot discharge to surface waters or onto the ground surface in a manner that creates a nuisance. There must be at least 50 feet of horizontal separation between where a softener discharges onto or into the soil and a well. This separation distance doubles to a minimum of 100 feet if the well has less than 50 feet of casing or does not penetrate at least ten feet of clay (i.e. a sensitive well).

Water Softener Dos and Don'ts

Do	Don't
Follow the manufacturer's recommendations for installation, operation, and maintenance including the use of iron removal additives if needed.	Do not install a backwash drain line that is excessively long, elevated, or reduced in diameter beyond the manufacturer's recommendation.
Provide an air gap for the backwash drain line (see photo). An air gap prevents wastewater from potentially being siphoned into the water system.	Do not allow the backwash drain line to discharge wastewater to the soil within 50 feet of any deep water well or within 100 feet of a sensitive well.
Keep the brine tank properly covered.	Do not store things on top of the brine tank cover.
Maintain an adequate supply of water softener salt in the brine tank, i.e. at or above the tank's water level.	Do not locate the softener or brine tank unprotected outdoors.
Obtain water softener salt from a reputable source and ensure that the salt bags are clean and stored in a sanitary manner.	Do not allow nonfunctional softeners (or other non-operating treatment units) to remain connected to the water system.
Periodically clean and disinfect the brine tank.	Do not locate the softener or brine tank below sewer lines or other areas prone to contamination.

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RV 09/21/23
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