

Quality Water

Program #1—on a video containing SIX PROGRAMS about safe and effective water systems

Hard Water

*This VIEWER REFERENCE GUIDE
is yours to keep!
DO NOT RETURN IT
when you return the video.*

What are the signs of hard water?

- ❑ *Water containing lots of calcium and magnesium*
- roughened, hard-to-clean, dull, unsightly surfaces (deposits) in bathtub, sink, shower, coffee pot, teakettle.
- increased cost of heating water (scale buildup in the water heater).
- reduced water flow from faucets (scale buildup in water pipes).
- scale deposits and corrosion may shorten the useful life of water-using appliances, water heaters, and plumbing.
- floating deposits from melting ice cubes.

How do water softeners work?

- ❑ *Home water softeners use the ion-exchange process.* The softener's media tank is filled with a material—tiny beads of resin (polystyrene plastic) or zeolite (manufactured mineral)—that holds sodium ions which it exchanges for hardness ions.

The softening process

- When hard water passes through the media, calcium and magnesium ions (the hardness-causing minerals) are adsorbed by the ion-exchange resin or zeolite, and sodium ions are released.
- When the sodium is depleted, no further hardness can be adsorbed. The softener is then “exhausted,” and must be “regenerated.”
- Salt brine (containing high concentrations of sodium) is used to regenerate the softener. This removes calcium and magnesium and replaces

sodium on the exchange sites so more water can be softened. Finally, the media is flushed to remove brine.

If softeners operate on the same principle, why do some cost under \$500, others over \$1,500?

- ❑ *There are several possible reasons—installation, warranty, service—but a key one is the way in which regeneration is controlled.*

Three common regeneration control systems

- **Time-clock control.** A time clock initiates regeneration on a fixed schedule (every day, every fifth day, etc.) depending on need. Fixed regeneration scheduling may waste water and salt by unnecessary regeneration—when you're away from home—or you may run out of soft water when you have increased use, as with guests.
- **Water meter control.** Regeneration begins when a set volume has been used. This reduces unnecessary regeneration, but is insensitive to hardness changes and you may be without softened water unless you have a second media tank. Usually, meter controls are more expensive than time-clock controls and two tanks increase the cost.
- **Hardness sensor control.** Sensor detects hardness of the softened water and initiates regeneration when needed. This minimizes potential for unnecessary regeneration, but is usually the most expensive type of softener.

Do I need a softener?

❑ *That depends on appliance life and cleaning requirements. Water softeners reduce corrosion, extend appliance life and reduce water heating costs. However, softeners have only been economically justified when a high value is placed on convenience of reduced cleaning.*

Recommended steps in selecting a home water softener

❑ *Test water for hardness, iron, and manganese. Select softener size and choose dealer, brand, and model.*

Questions to ask a dealer

- Discuss the level of service and cost of service the dealer will provide.
- Ask about hardness removal capacity—the amount of hardness that can be removed between regenerations. Softeners with small capacities must regenerate more often.
- Ask about rated service flow—the number of gallons per minute the unit can soften. Needs will vary with the number of water-using fixtures in the household and the number of persons using them.
- Ask about iron and manganese capacity. It is not unusual for iron and manganese to be more limiting than hardness. If the iron or manganese levels in your water exceed the maximum removal capacity recommended by the manufacturer for the unit you are considering, it may foul the media and reduce its capacity. With very high levels, your equipment dealer may recommend installation of an iron filter ahead of the softener or zeolite exchange media to prevent fouling.

NOTE—Your daily softening needs (size of softener) depend on:

A. your water use—the number of persons in your household. Use water meter readings with no outside use to determine average water use, or estimate 50 to 75 gallons per person per day.

B. the hardness of your water. Example: Daily hardness removal = daily household water use (measured in gallons) times the hardness of the water (measured in grains per gallon) or 200 gallons per day x 15 grains per gallon = 3,000 grains of hardness removed daily.

Some common questions and answers about softeners

Q. *My softener worked great when it was first installed, but it seems to need recharging more frequently than it used to. Why?*

A. Iron fouling is the most common cause of deteriorating softener performance. Using salt with an additive or adding a resin cleaner will remove accumulated iron during regeneration. You may need to do this several times. In severe cases it may be necessary to have the resin professionally cleaned or replaced.

Q. *Is sodium added to my water when softened by ion exchange?*

A. Yes. The amount of sodium added to your water is roughly equal to half the hardness of your water, measured in milligrams per liter. For example, if your water hardness is 400 milligrams per liter (calcium carbonate), then softening will add about 200 milligrams per liter of sodium to your water.

Q. *Will softened water taste salty?*

A. No. If your unsoftened water is not too salty, it should not taste salty after softening. After regeneration the salt brine is flushed out before the softener is returned to service. Chloride is more responsible for a salty taste than sodium.

Q. *Should I drink softened water?*

A. We recommend you drink unsoftened water. See Extension bulletin “Sodium in Drinking Water.”

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Sources of additional information

- Your local health department or county Extension office
- Your local library
- NSF International, P.O. Box 130140, Ann Arbor, MI 48113-0140 (313-769-8010)
- Water Quality Association, 4151 Naperville Rd., Lisle, IL 60532 (708-505-0160)