



FORT DEFIANCE INDUSTRIES

Water Softening Process Information

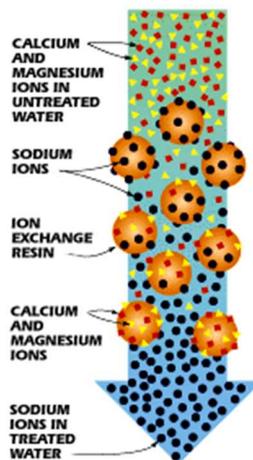
While water is in the ground, it picks up soluble bits of whatever it passes through. While this can mean contamination that makes the water unfit to drink, in many cases it simply means that the water contains minerals found in the earth. Of these, calcium and magnesium are of particular importance because they affect the water's ability to function in our homes. These minerals make our water hard.

Calcium and magnesium deposits can build up in pipes, reducing flow to taps and appliances. In water heaters, these minerals generate a scale buildup that reduces the efficiency and life of the heater.

All water softeners use the same operating principle: They trade the minerals for something else, in most cases sodium. The process is called ion exchange. The heart of a water softener is a mineral tank. It's filled with small polystyrene beads, also known as resin or zeolite. The beads carry a negative charge.

Calcium and magnesium in water both carry positive charges. This means that these minerals will cling to the beads as the hard water passes through the mineral tank. Sodium ions also have positive charges, albeit not as strong as the charge on the calcium and magnesium. When a very strong brine solution is flushed through a tank that has beads already saturated with calcium and magnesium, the sheer volume of the sodium ions is enough to drive the calcium and magnesium ions off the beads.

In normal operation, hard water moves into the mineral tank and the calcium and magnesium ions move to the beads, replacing sodium ions. The sodium ions go into the water. Once the beads are saturated with calcium and magnesium, the unit enters a 3-phase regenerating cycle. First, the backwash phase reverses water flow to flush dirt out of the tank. In the recharge phase, the concentrated sodium-rich salt solution is carried ... through the mineral tank. The sodium collects on the beads, replacing the calcium and magnesium, which go down the drain. Once this phase is over, the mineral tank is flushed of excess brine...



The information in this paper was taken from:

Klenck, T. (1998, July 31). How it Works: Water Softener. Retrieved from

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