



### Did you know . . .

Many water treatment systems that are effective at reducing iron and manganese will also be effective at reducing hydrogen sulfide. This is the compound known to cause water to have a rotten egg odor.



## About Iron and Manganese in Drinking Water



Iron and manganese are minerals commonly found in groundwater supplies. Although iron is more common, the two are frequently found together.

Although not considered a health issue for most people, high levels of these minerals can cause discolored water and stained plumbing fixtures as well as contribute an unpleasant metallic taste to water. For this reason, the U.S. Environmental Protection Agency (EPA) has established a recommended maximum contaminant level of 0.3 milligrams per liter (mg/L) for iron and 0.05 mg/L for manganese.

### Dissolved vs. Particulate Iron/Manganese

While water tests generally report the overall level of iron and/or manganese, they don't usually indicate the form, which is important to know when trying to select a treatment option.

Both iron and manganese can be found in water either in a dissolved or particulate state. For example, when water drawn from the tap appears clear initially, but slowly develops a red or blackish hue as it is exposed to air, the iron or manganese is said to be in the dissolved state. In contrast, when tap water comes from the tap as rust or blackish colored, or you can see red or black particles settling to the bottom of the glass, you have the particulate form of iron or manganese.

### Treatment Options

In addition to the type of iron and/or manganese that is present, the effectiveness of treatment system options can also be affected by the water's pH and hardness content as well as the presence of microorganisms such as iron bacteria.

Although not a health issue, iron bacteria are frequently found in water supplies that contain significant levels of iron (2 to 5 mg/L). Their presence can usually be detected by checking a toilet's fresh water tank to see if a gelatinous film has developed below the water line.

- **Chlorination/filtration.** This treatment option is recommended for individuals who have iron bacteria present in their water supply. The chlorine will not only control iron bacterial growth, but also oxidize the iron, bringing it out of solution so that it can then be filtered through a sediment or backwashing filter.
- **Water Softeners.** [Salt-based softeners](#) that contain a cation exchange resin can usually help reduce small amounts of dissolved iron and/or manganese from water (less than 1 mg/L iron). They are generally not used to treat higher concentrations of these minerals due to concerns about excessive buildup of residue on the softener resin. They are usually only considered if water hardness is also a problem, and these systems will not work well if iron bacteria are also present.
- **Oxidizing Filters.** Oxidizing filters are generally used to treat higher levels of iron and manganese. Examples of products that fall into this category include greensand, anthrasand (anthracite sand) and zeolite filters. While these systems can generally be used to treat both dissolved and particulate iron, the pH of the water must be at least 7.0. Both also require some regular maintenance/backwashing to remove the iron and manganese captured by the system.
- **Reverse Osmosis.** For water supplies containing trace levels of iron that are adversely affecting taste, a [reverse osmosis system](#) at the kitchen sink can be used.