Iron in Your Water Supply
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Problems caused by iron
If your water supply contains iron you may have some or all of these problems:

Laundry—may have rust spots or entire garment may have yellow or pink cast.
Household fixtures—rust deposit.
Drinking water—metallic taste.
Coffee and tea—discoloration, off flavor.
Dishwasher—brown deposit on lining, brown film on glassware.

Where does the iron come from?
There are two sources of iron or rust in water:

1. The soil.
   As water goes through the earth it dissolves iron from iron-bearing strata. In this case water is usually clear when drawn from the faucet but may turn rust-colored shortly afterward.

2. The pipes.
   The water may be acid thereby causing the pipes or plumbing to rust or corrode. In this case the first water drawn from the faucet may appear rusty but the water will soon clear.

Types of water
The more troublesome rust stains come from shallow domestic wells or from small-size rural water systems.

Ordinarily the iron in well water is in soluble form, as ferrous bicarbonate, which is colorless. After standing or when heated this water becomes cloudy and then a reddish sediment appears.

When the colorless iron compound is exposed to the oxygen of the air it is converted to ferric hydroxide, the red form.

If the water can be aerated and settled before use, part of the iron can be changed to the insoluble ferric hydroxide form and filtered out. Municipal water systems have facilities for doing this, and so water delivered to homes is relatively free from iron.

Home laundry problems
Soap added to water containing soluble iron changes the iron to an insoluble form. This settles on fabrics and results in a yellowish discoloration. Detergent is less likely to cause the rust to settle because it helps keep iron in suspension.

When soap has been used, the greatest difficulty appears during rinsing. At this time there is little suspending agent present to prevent the iron from being absorbed by the fibers.

Don't use a chlorine type bleach in water containing iron. Bleach reacts with the soluble iron in the water changing it to rust. This only intensifies the yellow color and makes the problem worse. A perborate or persulfate bleach (often referred to as all-fabric bleach or mild bleach) will cause no trouble, neither will these bleaches remove the discoloration.

What can be done?
There are several ways to solve the iron problem. The one to choose will depend to some extent on the hardness of the water, the amount of iron present, and the cost.

Iron content is expressed as parts per million (ppm). Authorities differ on acceptable limits for household use. The water conditioning industry uses 0.3 ppm as an upper limit. Anything below this should not cause a problem in the home.

Four ways of solving the iron problem are given below.

- **Home water conditioner.** Your water may be sufficiently hard to warrant the use of an installed tank-type conditioner. If so, the resins in the tank will have affinity also for iron. Although the resins will greatly reduce the amount of iron, efficiency of the tank for removing the calcium and magnesium hardness will decrease because the iron will tend to stick to the resins and clog the tank.

- **Installed iron-removal filter.** It is important that such a filter be installed into the plumbing system ahead of the water heater. This method is designed to remove suspended particles only, and is not effective if the iron is in a soluble form. Cost of the filter is relatively high.

- **Phosphate feeder.** This is a small feeding device which is installed between the pump and the pressure tank of a private well system. Small amounts of food-grade phosphate are dissolved into the water system.
The phosphate allows the ferric oxide to remain soluble and colorless. Therefore, the iron does not become insoluble and red, and does not deposit as rust on clothes or plumbing. Phosphate feeders have their limitations when iron content is high.

Purchase of such a feeder should be made carefully. The feeder must be large enough to insure the addition of 3 parts per million of the phosphate to each part per million of iron. Competent help in purchasing and installing a device of this nature can be obtained from leading plumbing supply houses.

- **Packaged water conditioner.** If water contains only a moderate amount of iron, a packaged water conditioner will do a good job. This should be the nonprecipitating type such as Calgon. This conditioner holds iron in suspension and does not allow it to deposit on the clothes.

Add the conditioner to the water before adding soap or detergent. It should be used in the first rinse also.

These products are fairly expensive, but with their use chlorine type bleach can be added to the wash water if desired.

**Recommendation.** If you have iron in your water supply, don’t try to solve the problem yourself. Get competent help.

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**TO REMOVE RUST**

**From laundry**

- **Color remover** such as Rit, Tintex, or Putnum, will remove the yellow film caused by rusty water. This can be used on white or undyed fabrics. Do not use it in the washing machine. Directions are on the package.

- **Oxalic acid** will also remove the yellow film. This is poisonous and must be handled with care. Test on a sample of fabric before using; it may affect some dyes. Oxalic acid may be bought in the drug store in crystal or jelly forms. The jelly comes in a tube and is safer to handle than the dissolved crystals. Follow directions on the package.

To use oxalic acid crystals dissolve about \(\frac{1}{4}\) cup (8 ounces) of crystals in a gallon of hot water in an *enamelware* container (*pail or dishpan, not sink*). Wear rubber gloves and dip fabric several times. Squeeze gently between dippings. Add 2 tablespoons ammonia to one gallon of water for the first rinse. Follow by a clear rinse. Repeat the treatment if necessary. Put in washer and run through complete laundry cycle. Thorough rinsing is important because the crystals are sharp and could cut threads if the solution dries in the fabric.

Oxalic acid jelly may be used to remove rust spots. Or, make a solution of 5 teaspoons oxalic acid crystals and 1 cup of hot water in a glass cup. Apply a few drops to spots and rinse carefully. Repeat if necessary. Neutralize with a few drops of ammonia in the water.

**Precaution:** Avoid contact of acid with skin. After use, flush acid down the toilet or empty in a cement laundry tray. Rinse. Do not put oxalic acid into enameled sinks, tubs, or the washing machine.

**From plumbing fixtures**

There are a number of commercial rust removers, such as Zud, on the market. These may be bought from hardware or grocery stores. Follow directions on the container for use on fixtures.

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Parts of this material were adapted from University of California One Sheet Answer, "Iron in Your Home Water Supply."

For clarification trade names of some products have been mentioned. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.