

30 mg/L of iron. This method requires retention tanks, air release valves and mixing devices.

- b) Chlorination-filtration - This method is used for water with high iron concentrations. The chlorine will oxidize iron before removal by ion exchange or filtration. A special iron filter performs both oxidizing and filtering steps followed by carbon filtration to remove excess chlorine.
- c) Manganese Greensand Filter - These filters can remove up to 10 mg/L of iron and use potassium permanganate to oxidize the iron. These filters must be regenerated on a regular basis.
- d) Aeration and Settling - Outdoor settling basins and aeration can remove some iron in the water.

Note: For colloidal iron, there may be a need to add polymers (alum) to form larger clumps, followed by oxidation and filtration.

3. Chemical Sequestration (Polyphosphate)

The water is treated with an organic compound (polyphosphate) to form a complex. The iron then remains suspended in the water with no staining. This treatment is not used for potable water.

4. Iron Bacteria

This can be controlled by shock chlorination.

Other resources available from Environmental Public Health Services:

- ◆ Shock Chlorination Procedures for Wells
- ◆ Drinking Water Treatment Devices

Public Health Division
Environmental Public Health Services

How to Control Iron and Iron Bacteria in Wells



Public Health Division
Environmental Public Health Services

For more information, please contact your nearest Environmental Public Health Services office.

Edmonton Main Office	(780) 413-7928
Capital Health Centre - South Tower	(780) 735-1400
Strathcona	(780) 467-5571
Spruce Grove	(780) 962-7509
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Capital Health
EDMONTON AREA

Iron is a common concern for groundwater. The removal of iron is dependent on the types and concentration of iron and often require a combination of treatment devices.

Most Common Types of Iron

Ferrous - soluble iron. Water appears clear when discharged, but turns black (oxidizes) when left standing. Ferrous iron also gives a metallic taste to the water.

Ferric - oxidized iron. Appears as rust and is suspended in water. When left standing, the water will turn yellow and the rust will settle. Ferric iron will not dissolve but will build up as sludge or scale which can break loose and can result in rusty water.

Iron bacteria - Creates a slimy, mucous-like layer in toilet tanks and gelatinous sludge in pipes. If the water is reddish-brown, and the colour is removed when the water is passed through a 0.5 µm (micron) filter, then the iron present is in the form of bacteria. The smell may resemble fuel oil, cucumber, or sewage. It may be most noticeable in the morning or after other periods of non-use.



Iron bacteria can cause staining of plumbing fixtures

Less Common Types of Iron

Organic state - iron combines with tannins and other organics and cannot be removed by an ion exchange or oxidizing filter. A carbon filter would be needed for removal.

Colloidal state - small particles of oxidized iron are suspended in the water and are bound together with other iron particles.

Source of Iron

- ◆ Iron is a natural (parent) material of soil around the well or may be from the plumbing system.

Potential Health Effects

- ◆ No known immediate health effects.
- ◆ Metallic taste, staining of clothing and fixtures and promotes the growth of iron bacteria in water systems. Iron bacteria are not disease causing bacteria.
- ◆ Affects appearance and taste of water.

Treatment

Oxidation, ion exchange, filtration or aeration are the most common methods of iron treatment.

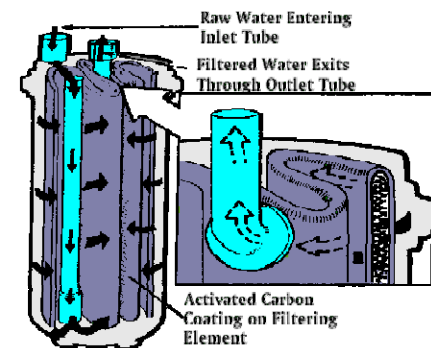
The devices for treatment used most often are:

1. Cation-exchange Softener

This method can treat up to 3 mg/L of iron that is in the ferrous state. Ferric iron will clog the exchanger. Iron is filtered from water by the softener's resin bed and is removed during regeneration. A resin-cleaning compound (sodium hydrosulphite or phosphoric acid) is needed to clean the unit.

2. Oxidation (iron filters)

- a) Air Injection - Air is used to oxidize soluble iron to form rust which is then filtered out (usually by a carbon filter). This method can treat up to



Contaminants are adsorbed onto the carbon media