

Iron (Fe)

What is Iron?

Iron is the fourth most abundant element, by mass, in the Earth's crust. The core of the Earth is thought to be largely composed of iron with nickel and sulfur. Iron is an essential trace element for all living organisms and is an essential element in human nutrition. A lot of this is in hemoglobin, in the blood. Hemoglobin carries oxygen from our lungs to the cells, where it is needed for tissue respiration.

Does Iron have any additional names?

No, but it can exist in different forms such as iron (II) and iron (III).

What are the known health effects?

Iron may cause conjunctivitis, choroiditis, and retinitis if it contacts and remains in the tissues. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable as an x-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

How does exposure occur?

Iron can be found in meat, whole meal products, potatoes, and vegetables. The human body absorbs iron in animal products faster than iron in plant products. Iron is an essential part of hemoglobin; the red coloring agent of the blood that transports oxygen through our bodies. As rain falls or snow melts on the land surface and water seeps through iron-bearing soil and rock, iron can be dissolved into water supply sources. In some cases, iron can also result from corrosion of iron or steel well casing or water pipes. Similar to how iron in a metal pail turns to rust when exposed to water and oxygen, iron minerals in water turn to rust and stain plumbing fixtures and laundry.

Ground water in southern New Jersey contains a large concentration of naturally occurring iron, so much that the odor and color of water supplies are affected. As such, we remove the iron at our water treatment plant, before sending it into our distribution piping. The water we buy from WMUA and NJAWC is also treated for iron removal. If you've noticed rust colored curbs and sidewalks throughout Mount Laurel, that is because privately owned wells without iron removal are being used for irrigation purposes.

Is this contaminant regulated?

Iron is a secondary contaminant by USEPA and NJDEP which is a non-enforceable guideline for aesthetics. Iron does not have a maximum contaminant level; it has a recommended upper limit (RUL) of 0.3 ppm for odor, taste, color, staining and scaling. Water supplied to MLTMUA customers has a detected maximum level of 0.212 ppm.

How can I reduce exposure?

There are several different approaches to removing iron and other minerals from water, including filtration, softening, chlorination, ozonation, greensand, ion exchange, aeration.

Additional information iron, including the information referenced, can be found at:

https://www.who.int/water_sanitation_health/dwg/chemicals/iron.pdf

<https://todayshomeowner.com/how-to-remove-iron-and-rust-from-drinking-water/>