



Specialized Systems

Arsenic Removal through simple filtration

Application:

Arsenic removal in ground water source.

System Design:

Oxidation & Filtration

Co-precipitation with Fe

20ppb As : 1ppm Fe

MCL = 10µg/L

Date: 2020

Additional documentation:
Support reading material link to H&T web site

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The Origin of Arsenic: Arsenic is an element that occurs in the earth's crust. Accordingly, there are natural sources of exposure. These include weathering of rocks and erosion depositing arsenic in water bodies and uptake of the metal by animals and plants.

Consumption of food and water are the major sources of arsenic exposure for the majority of the population. People may also be exposed from industrial sources, since arsenic is used in semiconductor manufacturing, petroleum refining, wood preservatives, animal feed additives and herbicides.

Public Health Concerns : Arsenic can combine with other elements for form inorganic and organic arsenical. In general, inorganic derivatives are regarded as more toxic than the organic forms. While food contains both inorganic and organic arsenical, mainly inorganic forms are present in water. Exposure to Arsenic at high levels poses serious health effects, since it is a known human carcinogen. In addition, it has been reported to affect the vascular system in humans and has been associated with the development of diabetes. Arsenic is poisonous in doses significantly larger than 65mg (1grain), and the poisoning can arise from a single large dose, or from repeated small doses, as, for example inhalation of arsenical gases or dust.

Treatment Technology: In water, the most common valence states of arsenic are As^{+5} (or arsenate) which is more prevalent in the aerobic surface waters, and As^{+3} (or arsenite) which is more likely to occur in anaerobic ground waters. As^{+3} may be converted through pre-oxidation to As^{+5} . In the arsenate state, arsenic tends to adhere to ferric hydroxide, a common precipitate produced in the GreensandPlus filtration process.



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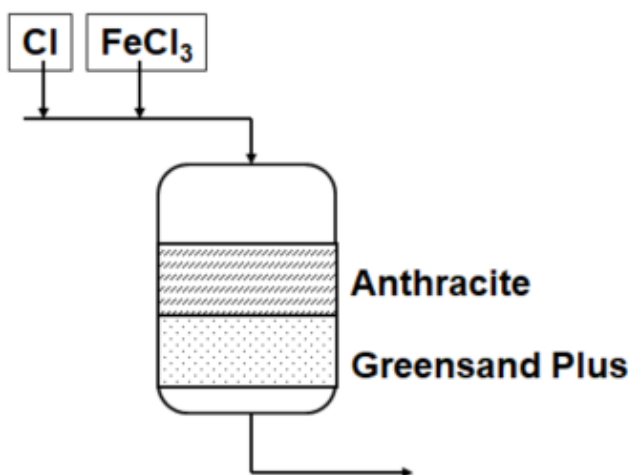
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Typical System Components: In applications where there is sufficient Fe in the raw ground water, only oxidant need be injected upstream of the filter system. If insufficient levels of Fe are present then a supplemental FeCl₃ injection will be required.

Typical Flow Diagram





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Advantages of Simple Filtration over other Technologies:

- Up to 95% removal of total arsenic through a simple, single-stage filtration process alone.
- Simple control requirements, can be fully automated for minimal operator intervention.
- No need for expensive, and complicated membrane systems.
- Efficient operation, minimal waste product with no need for neutralization.
- No need for expensive, consumable ion exchange resins or regeneration equipment.
- No need for redundant pretreatment processes.
- No handling of dangerous chemicals.

Through careful analysis of raw water quality data, Hungerford & Terry can design and fabricate a treatment solution for your WTP.

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Since 1909 Hungerford & Terry Inc. sets industry standards in engineering, design and manufacture of innovative and efficient water treatment systems.

Systems include removal of Iron, Manganese, Arsenic, and Radium; High-efficiency / low-waste Nitrate removal; PFOS/PFAS, Color removal, Chrome-6 removal, Perchlorate removal, Degasifiers Towers, Condensate Polishers and complete Demineralizers for Boiler Feedwater in the Energy sector.