FerroSorp® Plus

Granular ferric hydroxide for the effective removal of water contaminants

General

Because of its chemical activity ferric (III) hydroxide is quite appropriate to bind arsenate, phosphate or sulfide ions in aqueous media. The technical use of this universal absorbing material has failed until now because of its pasteous appearance. This typical manifestation of ferric hydroxide makes it difficult to handle and prevents the use in simple filtration columns.
Using a patented process ferric hydroxide can now be produced in a granular form. Various bead diameters can be made by combination of crushing and sieving procedures. This gives access to a great variety of new applications for the chemical interesting ferric (III) hydroxide.

Operation

In a first step arsenate or phosphate ions in aqueous solutions were adsorptively bounded to the surface of FerroSorp® Plus. Second step is a chemical conversion to stable ferric arsenate or ferric phosphate.
Sulfide ions formed from hydrogen sulfide in water are removed in a similar way under precipitation of hardly soluble ferric sulfide.

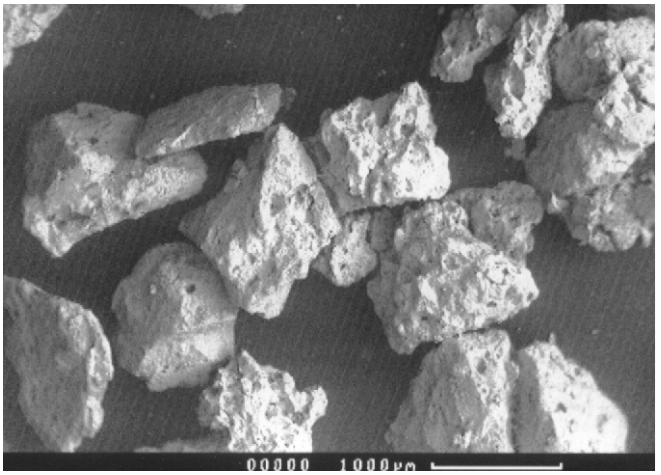


Fig.1 : Picture of FerroSorp® Plus granules using an Scanning Electron Microscope

The binding mechanism of heavy metal ions is understood as a combination of adsorption followed by fixation inside the crystal lattice of ferric hydroxide.
Furthermore a relatively unspecific adsorption of organic waste water ingredients is possible.
The chemical reactions of phosphate, arsenate and hydrogen sulfide with ferric hydroxide are shown in the following simplified equations:

$$Fe(OH)_3 + H_3PO_4 \rightarrow FePO_4 + 3\ H_2O$$

ferric phosphate

$$Fe(OH)_3 + H_3AsO_4 \rightarrow FeAsO_4 + 3\ H_2O$$

ferric arsenate

$$2\ Fe(OH)_3 + 3\ H_2S \rightarrow 2\ Fe_2S_3 + 6\ H_2O$$

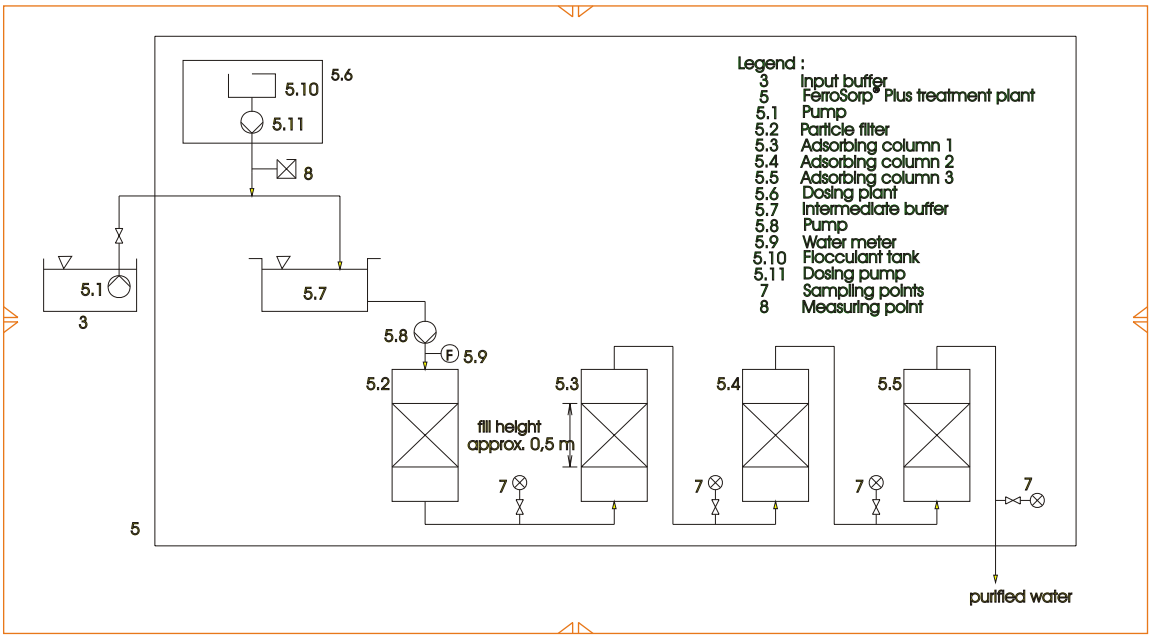
ferric sulfide

Recommendation of application

From the present point of view the use of FerroSorp® Plus is suitable for:
- elimination of arsenic from drinking water
- binding of phosphate from rivers and lakes (flood restoration)
- treatment of heavy metal polluted industrial waste waters
- treatment of contaminated ground water
- filter beds for the separation of phosphate compounds in wet lands
- "reactive barriers" for the confinement of contamination in depositions
- binding of nutritive substances in aquarium or garden pond treatment.

Experimental water treatment plant

For technical tests using granular ferric hydroxide FerroSorp® Plus an experimental treatment plant is available. It contains up to three solid bed columns and the possibility of a previous removal of turbidities.



General benefits

High cleaning capacity - low costs

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High absorbing capacity because of high specific surface

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Simple treatment equipment with low maintenance requirements

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Wide operational range from pH 4 to pH 9

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Environmental Protection - State of the Art