



TECHNICAL BULLETIN: Wastewater

Enhanced Sludge Conditioning and Dewatering with Ferric Sulfate

Ferric Sulfate is commonly used in wastewater treatment operations for phosphorus reduction, clarification and hydrogen sulfide control. In addition, ferric sulfate use improves the physical properties and handling of sludge.

Enhanced Sludge Conditioning

Liquid/solid separation of bio-sludge occurs most effectively with optimal chemical preconditioning. Most importantly, ferric sulfate satisfies the high cationic demand of bacterially activated sludge. It also produces moderately sized, but densely formed flocs from synthetic polymer flocculants. Though dependent on individual sludge characteristics, adjusting sludge pH to the 4-7 range with ferric sulfate typically provides optimum dewatering performance.

Sludge Thickening

Many water and wastewater plants use various mechanical means to thicken dilute sludge from the clarification process. Employing ferric sulfate to pre-condition sludge before a thickener will lower the polymer flocculant dosage required for thickening. Sludge treated with ferric sulfate will also have improved effluent (filtrate) clarity.

Dewatering

In belt presses, ferric sulfate sludge conditioning has the potential to reduce polymer dosage and achieve higher cake solids concentration.

The operator will have the option to increase applied belt pressure or slow the belt speed without fouling the belts. These options exist because ferric sulfate helps the polymer produce a denser, more freely draining floc. In many cases, ferric sulfate will help lower filtrate solids because fewer solids will adhere to the belts. Not only are there fewer solids to wash from the belts, but shower water consumption may be reduced.

Belt presses also tend to be a source of odor from hydrogen sulfide in the sludge. Ferric sulfate, added upstream, will significantly reduce odor from H₂S. Ferric sulfate, less corrosive than iron chlorides, will not pit stainless steel, so structural belt press frames will last longer.

Free draining, dense floc formation is critical for **centrifuges** to perform most efficiently. Treating the sludge with ferric sulfate will not only lower polymer flocculant dosage, it will condition the sludge to undergo the high shear forces generated in a centrifuge.

Filtration

Fine media filters used in tertiary treatment benefit from influent pre-conditioning with ferric sulfate. Ferric sulfate enhances phosphorus, BOD and COD removal.

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