

Hydroxide Precipitation versus Floccin™ for Metals Removal

The traditional approach for metals removal is Hydroxide Precipitation where the solubility for the metals changes to insoluble (precipitation) in the form of a metal Hydroxide as the pH increases.

The common pH range for this is between 10-11 pH depending on the metal. Lime (calcium hydroxide or CAOH_2), caustic (sodium hydroxide or NAOH) or magnesium hydroxide (MgOH_2) are generally the chemicals of choice as the hydroxide ion source. The process uses a rapid mix to add the hydroxide source and usually an anionic flocculant to help as a settling aid and sludge conditioner.

The problems with this technology are:

- Large volumes of sludge production
- Inability of the metal hydroxide to become sufficiently insoluble if chelating or surfactants are in the water
- Unstable treated metal levels especially if the influent is highly variable.

The quantity of sludge is directly proportional to the amount of hydroxide source added. This can range from 500 to 3,000 ppm by weight and yields 4 times this weight in sludge addition assuming a 25% dry sludge cake.

The dewatered sludge is then classified by its leachable metals following the EPA TCLP/STLC testing protocols where hydroxide sludge most often leach their heavy metals and are therefore classified as hazardous.

Additional problems are in the form of dewatering difficulties (wet sludge) and scale buildup which blocks water passages in the dewatering equipment, such as a plate and frame press (most commonly used).

Floccin™ For Heavy Metals Removal

The Floccin™ has the ability to remove heavy metals without hydroxide precipitation with treated metal levels far below what hydroxide precipitation can achieve.

The reason is the Floccin™ coagulates, flocculates and most important undergoes an ion exchange to remove the metals from wastewater.

The dosage is much less than hydroxide techniques, generates less sludge, settles faster, reacts quicker, is less pH dependent and the sludge usually passes the EPA TCLP/STLC testing so it can be reclassified as nonhazardous but regulated. The application is the same using a rapid mix and then settling in a clarifier.



The cost comparison can be significant when considering cost per gallon treated:

- Reduced sludge
- Reclassification of sludge (reclassification as nonhazardous due to nonleaching reduces the long term environmental risk for landfill leachate cleanup)
- Increased settling rates equates to increased system throughput
- Less equipment scaling from deposits
- Simplification of operation.

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