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METHODS OF BATCH TREATMENT

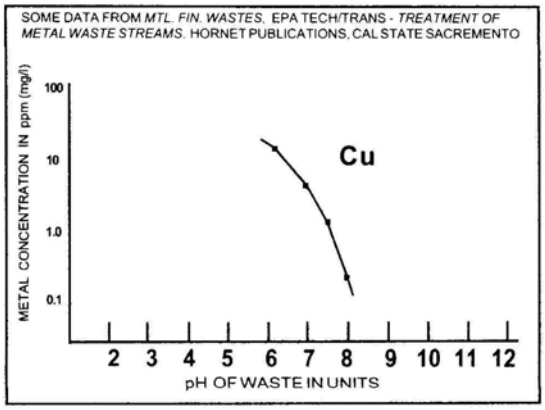
COPPER METAL IN SOLUTION

TYPICAL SOURCES:

Copper as a metal in solution has many possible sources. It is almost a universal metal because of its many useful and necessary qualitites. Electro-plating, electro-forming, electronics, printed circuts, jewery, castings, mirror fabrication, aerospace, decorative finishing, are just a few. Copper is used in many alloys and processing these can release copper into the waste water. Metals such as aluminum, brass, bronze all contain copper.

ASSUMPTIONS & NOTES:

For the purposes of this report, we will assume that the copper metal is in a waste water stream or concentrate resulting from an acid copper plating bath or an acidified copper stripper. Please note that many copper plating baths are cyanide based and as such will require the neutralization and destruction of the cyanide prior to any treatment for the copper metal.



METHODS & PROCEDURES

Copper as a metal in solution can be effectively removed from most waste water streams with a variety of chemical precipitants. The first step in treating for copper metal is to perform a jar test to determine the unique characteristics of your waste stream. Slowly bring the pH of the waste stream up to the optimum level in .5 pH increments. As a precipitant is formed test each level to determine the best pH value for your stream.

As with most metal bearing streams, it is very important to remove oils and other organics before treating for copper. This is because organics will interfer with the floc building process and tend to blind the filter press.

After completing the jar testing, have the resultant clear water and sludge tested in a certified lab. This helps to verify the optimum level for copper removal. Knowing this level is important for many reasons. One of the biggest reasons is money! If the sludge contains sufficient copper metal, it can be sent to a recycler at a much reduced cost. Also as sludge hauling is charged by weight and volume, it is important to use the right precipitant that will help reduce the sludge volume.

One other tip is to pick a reagent that helps stabilize the sludge so it can pass leach tests for landfill. Picking the right reagent is worth the effort of trial and error. A good vendor will help you with this process.

Some of the most common and best acting reagents are listed in the next columm. There are others on the market. Check with your vendor for information;

Magnesium hydroxide; Produces good results when dealing with acidified streams and concentrates. Magnesium Hydroxide does require longer reaction times to neutralize than sodium hydroxide. Mag Hydroxide can reduce the amount of sludge produced if used properly and not overdosed. It has a tendency to settle out in the supply tank unless agitated. This reagent is very beneficial in that it is much safer to use than sodium hydroxide and does not produce exothermic reactions, (heat build up). Magnesium hydroxide produces a very dense floc that filter presses well.

Sodium Hydroxide; is one of the most common reagents used. This chemical is very alkaline and requires special handling. Its advantages are that it is very strong and neutralizes rapidly. It does cause exotherm and burning of tissues if misused. The other advantage is low cost. Sodium Hydroxide produces a full floc with copper metal that is easy to filter press. Sludges with Sodium Hydroxide may require more stabilization than other reagents. Also sludge production is usually higher.

DTC (Dithiocarbamate). is marketed under many brand names. There are also some excellent second generation DTC compounds on the market. DTC is non pH specific. Thus it can significantly lower sludge concentrations. It has been shown to be especially effective when used in combination with Magnesium Hydroxide as a polish. If overdosed DTC can cause blinding of the filter press and high toxicity levels so run jar testing before committing.

Remember to always wear protective gear!