DESIGN WATER
TECHNOLOGIES

Explanation of Common Water Well Chemistry

Muriatic acid

- trademark name for a liquid, hydrochloric acid, HCl
- is actually a gas product blended into water to make it a liquid.
- this gas will go to vapors when put into a well causing extremely dangerous fumes which are deadly and corrosive to pump panels or metals, inside the well house.
- has an inhibitor blended into the acid to control corrosion but the inhibitor is used up within 6-8 hours so serves little purpose if the acid is left in longer. Most acids are left in the well for 12-24 hours. Dissolving debris is a function of pH. The lower the pH, the faster the rate of dissolution. In some cases, 16-18 hours are not enough time to fully dissolve all the debris in a well. Sometimes multiple pH adjustments are needed.
- many inhibitors are hazardous in nature but the name of the inhibitor is never listed.
- hydrochloric is a by-product of other manufacturing processes and will have numerous inherent, hazardous ingredients listed only as “Inert”. These may consist of unknown amounts of lead, arsenic, zinc, & TOCs. These hazardous ingredients are never monitored or measured and will vary drastically between batches.
- these inherent hazardous ingredients can present issues with disposal as classified as hazardous. Many states are banning the usage within potable water wells. There has been two projects (that I’m aware of) where lead was deposited into the aquifer and was very difficult to remove. Some states are requiring that any HcL used is treated as hazardous waste for disposal.

Sodium hypochlorite

- liquid chlorine with a variety of concentrations. Common household bleach is generally 5.25% and industrial grades are available between 10-15%
- as a liquid, is much more easily mixed in water than calcium hypochlorite (standard granular chlorine).
- all concentrations of liquids have issues with shelf life. Liquid bleach loses approximately 20% of it’s effectiveness every month. Industrial grade is in better containers and manufactured more frequently but still has a shelf life. Most companies can estimate actual concentrations at the time of purchase.
- standard chlorine is alkaline based. When used in water, pH will raise depending upon the concentration used in the field. Biocidal effectiveness is based upon pH. The production of hypochlorus gas provides biocidal tendencies and at 100% is between a pH of 5.5-6.0. The more chlorine you use, the greater the rise of pH, the less biocidal it becomes. High pH creates an oxidative chemistry which is corrosive, but not necessarily biocidal in nature unless left for several days.

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Calcium hypochlorite

- granular or pelleted chlorine with concentrations between 65-70%
- the base is calcium (30-35%)
  calcium as a base can be difficult to mix and fully dissolve in water that has > than 40 ppm calcium hardness which is at the point of saturation.
  in some cases with high hardness in well water, this calcium can actually plug a well.
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- Sterilene, a new chlorine, is not oxidative and has chemistry to control pH.

Polyphosphates

- two types, as glassy and crystalline
- crystalline available as sodium acid pyprophasphate, tetrasodium pyrophosphate or sodium tripolyphosphate
- glassy phosphate are available as sodium hexametaphosphate
- dosages recommended are about 15 lbs/100 gal of water.
- mixes easier in warm water than cold
- will present plugging issues if not mixed well in a tank at the surface. DO NOT pour directly into the well as a powder or granular.
- recently found that slime forming or iron bacteria use this product as a nutrient so is not widely used in wells any longer. See MudBuster for a polymer product that will not encourage bacterial growths and allow better penetration and removal of silts.
- will not be effective at removing bentonite drilling fluids because of the poly-accrillamides used to enhance carrying capacity in bentonite drilling fluids during drilling.
- MudBuster can be used far more successfully without the nutrient base.

Sodium bisulfite used to de-chlorinate water upon disposal

- a powder used to remove chlorine from water after a chlorinaiton prior to disposal
- dosage recommendations is approximately 0.012 lbs per 1000 gallons of chlorine solution per 1 ppm chlorine residual. Other products commonly available is, sulfur dioxide, sodium sulfite, and sodium thiosulfate. All have different concentrations and if require any further information, contact us. We have a market product available for Sterilene, a new chlorine.

Lime, soda ash or products traditionally used to neutralize acids

- are used for neutralization of acids once acids are removed from the well
- are alkaline powder or granular materials
- do not mix well in cold water. You will find approximately 20-40% of the powder in the bottom of the tank once mixed. That material must be disposed of as hazardous.
  there are no buffers within these products and pH can vary wildly and easily above 9.0. Most facilities will accept a pH between 6-9.0. If over 9, acids must be mixed to adjust pH into the required acceptable range.
- “pH Neutralize” is a liquid formulation (easy mixing) with a buffer to always control pH and never allow it to go above 9.0