By Rick Richardson

Chlorine Tablets

A Wise Alternative to Gas in Disinfection Applications

In the rush to move away from gaseous chlorine for disinfection, many industrial applications have quickly run to sodium hypochlorite. Bleach, the common name for sodium hypochlorite, is not the be-all-end-all to replace gas. With growing concerns over gas leaks, operator safety, and the well-being of those within the kill zones of gas cylinders, sodium hypochlorite may be the best and safest solution to meet our disinfection needs. As a result, the use of bleach has taught industrial users several things.

First, even if delivered to your site, bleach is very difficult to handle. It is not an easy chemical to have on site because it is very corrosive, highly toxic and potentially hazardous to personnel. Bleach at its best, is toxic and must be labeled as a hazardous chemical.

Second, bleach wreaks havoc on pumps, nearby electrical panels and clogs valves regularly. I have entered chlorine feed buildings before with corroded doors barely hanging on their hinges as well as green panels that give evidence that bleach had been used. The latest pump designs have sought to overcome the inherent weaknesses of bleach. The result of these pump design changes has been much like dressing up a pig to take to the Presidential Ball…This is in no way a reflection on the engineers' efforts to upgrade their pumps, but more so a reflection of the difficulty in handling bleach.

Finally, we should keep in mind the propensity of bleach to degrade rapidly. When affected by time and temperature, bleach degrades quickly leaving the majority of disinfectant liquid useless. As a result, the treated water may not be appropriately disinfected. Although, bleach or sodium hypochlorite has a lower price point, it does not often deliver the needed results.

Safe Alternative

There are several questions to ask: Is there a safe alternative? And the answer is yes, absolutely. When asked, "Which disinfectant do you believe to be the safest: a) Bleach; b) Chlorine gas; or c) Solid chlorine tablets?" Most water treatment professionals would agree that chlorine tablets, although still chlorine, are the safest type of chlorine available. The substantiation for this revolves around the fact that as tablets, the chlorine is in a solid form and it remains that way until dissolved into liquid.

There is a vast difference between a chlorine gas leak, a bleach spill and knocking over a bucket of tablets. A Chlorine gas leak has potentially deadly consequences. A bleach spill requires a hazmat response team, and a spill of chlorine tablets requires an operator with gloves, a dust mask and goggles to pick up the tablets and place them back into the bucket. Therefore, the question of safety in response to a spill leaves one leaning toward the use of chlorine in solid form. However, the major question now becomes "can tablets go into solution safely and then be fed back into your process accurately?" Again, the answer is yes.

Not Your Fathers Chlorinator

Like all technology, tablet chlorinators have continually evolved. This evolution has been enhanced by the need to find safe alternatives to gas and bleach.

Tablet chlorinators started out as nothing more than a bucket with water running over the tablets. This leaves much to be desired when trying to make consistent solution strength as well as feed it accurately. Tablet technology today can be just as accurate as traditional gas feeders. The goal is to find a system that makes solution on demand as well as uses some type of positive displacement

CHLORINATION vs GAS AND BLEACH

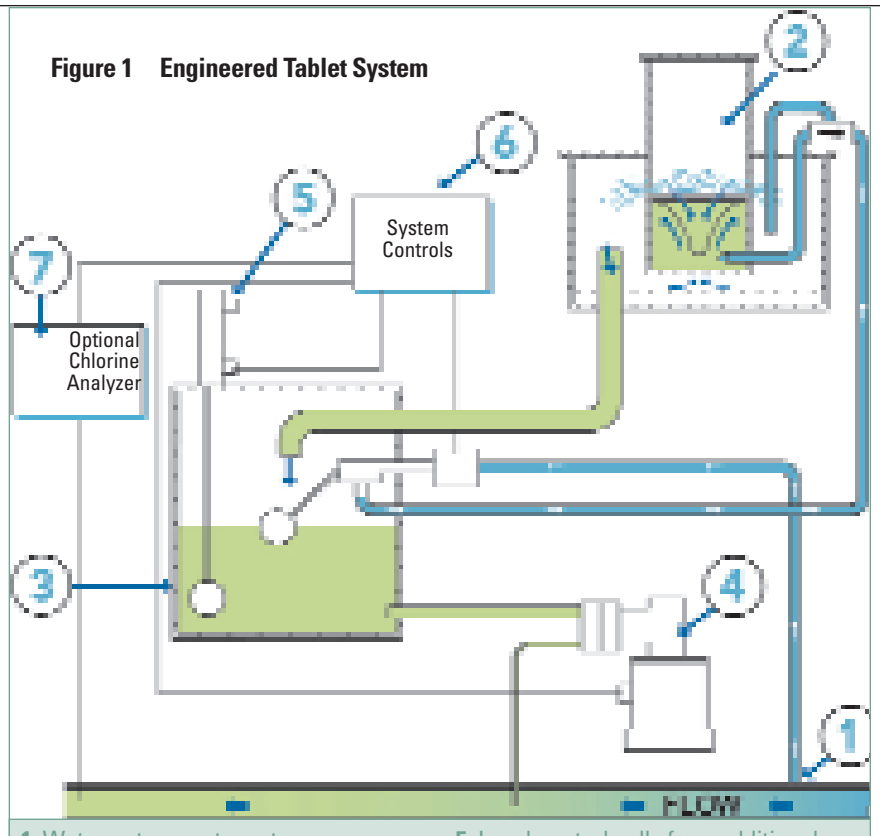
CHARACTERISTIC	TABLET	BLEACH	GAS
Safety	No spills	Spills & leaks cause significant damage	Leaks can cause significant damage
Price	Costs more up front; lower overall because of lower long-term operating costs	Lower up front costs; Liability insurance and EPA & OSHA regulations raise total cost	Lower up front costs; Liability insurance and EPA & OSHA regulations raise total cost
Convenience	Easy to handle; Lightweight - 55 lbs. of bleach	Heavy drums or many small carboys	Hard to maneuver cylinders; need special handling & training
pH effects	Lower pH (10.5) reduces acid usage by 50% or more	High pH; lots of acid for pH control	Very low pH; lots of messy soda ash, caustic for pH control
Strength Maintenance	Stable, consistent; only a small change over one year	Significant loss within a week	Consistently 100% chlorine
Control	Consistent strength provides reliable control	Constantly changing strength makes it difficult to control	Harder to automate
Storage	6 gal. pail holds the equivalent of 55 lbs. of bleach	Drums or bulk tanks; regulated by the EPA & OSHA	Regulated by the EPA & OSHA; separate room with special access, fans and scrubbers
Material Compatibility	Less corrosive	More corrosive; more fumes while operating	Very corrosive

metering pump. There are several systems on the market that make batches of chlorine solution on demand and then feed the solution via a variable speed metering pump. Anything other than a positive displacement metering pump on a tablet system may lead to accuracy problems. It is unlikely that an industrial user would choose a centrifugal pump over a metering pump to inject a chlorine solution. Centrifugal pumps are not intended for use in precise applications requiring accurate solution injection. When it comes to something as critical as disinfecting water, precise volumetric accuracy is a must. In addition, spare parts must be taken into consideration.

Final Thoughts

Because disinfecting water is a critical application, the fact should not be overlooked that at some point, the equipment in use may fail. Ask your manufacturer or representative for a spare parts list and then stock up on the critical parts that will keep your system running. When considering the evolution of tablet feeders, the safety of water treatment operators and nearby neighbors, tablet chlorination is a safe and wise alternative to gas and bleach. WQP

Figure 1 Engineered Tablet System



1. Water enters system at a fixed rate of 8 gals. per minute.
2. Vortex feeder generates desired solution strength.
3. Solution storage ready for injection.
4. Variable speed pump injects solution at appropriate rate.
5. Level control calls for a additional solution as required.
6. System controls (manual or automatic operation)
7. Optional chlorine analyzer automatically controls variable speed pumps and maintains set point chlorine residual.

About the Author
Rick Richardson is a vice president of sales and marketing for Hammonds Companies. He can be reached by phone at 800-582-4224 or visit www.waterchlorination.com.

LearnMore!

For more information related to this article, go to www.wqpmag.com/lm.cfm/wq120402

For more information on this subject, write in 1011 on the reader service card.

Write in 757