

# ARCH Briquette

A Report On Innovative Water & Wastewater Treatment Products & Technologies From Arch Chemicals, Inc.

## Calcium Hypochlorite Briquettes Provide Effective Alternative In Drinking Water Treatment

Many municipal water providers are switching from gaseous chlorine ( $Cl_2$ ) and sodium hypochlorite ( $NaOCl$ ) to calcium hypochlorite briquettes. This is proving to be an efficient solution to ensuring consistently accurate chlorination in drinking water while eliminating many long-standing concerns associated with  $Cl_2$  and  $NaOCl$  use.

### The Benefits Of Constant Chlor® Plus Cal Hypo Briquettes

In numerous drinking water applications, such as wellheads, small to medium sized surface water treatment plants, and booster stations (up to 10 MGD), Arch Chemicals, Inc.'s Constant Chlor Plus calcium hypochlorite briquettes and chlorinator systems provide the perfect solution.

Safety concerns associated with chlorine gas are eliminated by switching to calcium hypochlorite briquettes. Also, there is no off-gassing to cause leaks or air-bind metering pumps, a common problem with commercial  $NaOCl$  use.

Unlike with  $NaOCl$  use, bulk storage tanks are unnecessary when using Constant Chlor Plus briquettes and chlorinators, thereby eliminating the need to meet stringent secondary containment and chemical transfer requirements.

Briquettes provide a long storage shelf life, avoiding the rapid degradation of chemical strength that can severely impede chlorination consistency, a common problem with  $NaOCl$  use.

The briquettes are top-loaded into the chlorinator's large capacity hopper. Supply water is injected into the chlorinator through a level/timer controlled solenoid valve and sprays upward into the bed of briquettes (see related article, page 3). A short intermittent spray cycle produces an approximately 1.0 percent available chlorine solu-

tion, which is stored in the lower solution tank and is then pumped to the injection point.

### "Constant Chlor" Means Just That

The briquettes, specifically designed for use in the Constant Chlor Plus feed system, contain a minimum of 65 percent available chlorine (AVCl) by weight, along with a patented inhibitor to reduce the potential for carbonate scale associated with the alkalinity component of water.

Studies have shown that Constant Chlor Plus briquettes and chlorinators can provide significantly more consistent

chlorine residual in the desired range than typical  $NaOCl$  systems, ensuring more accurate and dependable chlorine use as well as eliminating taste and odor complaints associated with fluctuating chlorine residuals.

For example, based on the statistical analysis performed from data documented in a two-year pilot study conducted by the City of Plainview, N.Y., the Arch calcium hypochlorite system maintained a significantly more consistent chlorine residual compared to the district's sodium hypochlorite systems. Using the Constant Chlor Plus briquettes

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**By switching to Constant Chlor® Plus Briquettes (shown here actual size), water providers are reducing maintenance, manpower requirements and safety concerns while eliminating chlorine taste and odor complaints and ensuring more accurate and dependable chlorine use.**



WELCOME TO:

The **ARCH** Briquette

Welcome to *The Arch Briquette*. As maintaining water and environmental quality becomes more specialized and complex, useful and timely information about critical municipal water and wastewater disinfection operations becomes increasingly valuable. That's why we've introduced our new publication.

### Information You Can Use

Written for water and wastewater treatment professionals, *The Arch Briquette* looks at the science behind these operations and applies it to "real world" situations, providing reference items, case histories, field data, as well as practical information on how Arch Chemicals provides municipalities across the country with products and technologies that consistently and efficiently meet the toughest regulatory health and environmental standards.

We hope you like our first issue, and don't forget to fill out and mail the attached reply card today to receive upcoming issues of *The Arch Briquette*. ■

# Calcium Hypochlorite Briquettes Provide Effective Alternative In Drinking Water Treatment *(continued from page 1)*

and feed system, chlorine residual in the district's desired core range (0.5 to 0.7 mg/l) occurred 91.1 percent of the time, compared to a composite frequency rate of only 70.8 percent using sodium hypochlorite.

In addition, chlorine residual readings of 0.4 mg/l or less were documented during 6.6 percent of the study period with the calcium hypochlorite system, compared to 27.1 percent for the well sites employing sodium hypochlorite. *(For more information on the Plainview application, see article, right).*

## Reliable, Efficient Booster Chlorination

Besides providing highly effective well water and surface water treatment, Constant Chlor® Plus briquettes and chlorinators are ideal in gaining reliable and efficient booster chlorination for managing residual concentration in distributed water systems. The often remote locations of many booster chlorination stations can make transporting and storing Cl<sub>2</sub> cylinders or NaOCl drums impractical. But Constant Chlor Plus briquettes and chlorinators generate sanitizing solutions onsite.

Dry calcium hypochlorite briquettes can be transported in 50-lb. containers, with each container producing sufficient available chlorine to treat a typical 2 MGD drinking water flow for approximately seven days. By generating hypochlorite solution on site, the facility makes hypochlorite solution only as it needs it, eliminating the need for bulk solution or gas cylinder storage.

Ease of use and consistency of solution concentration were two of the reasons why a Northern California University started using Constant Chlor Plus briquettes and chlorinators three

years ago for booster chlorination *(see related article, page 3)*. The University reports the chlorinators have been highly effective in meeting its strict residual requirements while providing trouble-free operation.



## NSF Certified

Constant Chlor Plus briquettes

and spray feeder have been third-party certified by NSF to meet NSF/ANSI Standard 60 and 61 requirements for drinking water applications, thereby enhancing operator safety and performance. ■

*Want to learn more about how to achieve consistent chlorination while eliminating concerns asso-*



**Constant Chlor® Plus Briquette Chlorinators from Arch Chemicals typically provide significantly more consistent chlorine residual in the desired range compared to conventional NaOCl systems, thereby often eliminating the primary cause of chlorine taste and odor complaints.**

*ciated with chlorine gas and sodium hypochlorite use? Simply fill out and mail the enclosed postage paid reply card today.*

**For Plainview, N.Y. :**

## Constant Chlor® Plus Briquette Chlorinators Fit The Need

No Bulk Storage Tanks

Small Footprint

Easy Installation



Plainview Water District, in Plainview, N.Y., switched from commercial NaOCl to Arch Chemical's Constant Chlor® Plus calcium hypochlorite briquettes and chlorinators. A comprehensive two-year pilot study demonstrated numerous advantages to making the switch.

**Solving Taste & Odor Problems, O&M & Regulatory Concerns**

"Inconsistent NaOCl concentrations were bringing ongoing taste and odor complaints," says Paul Granger, district superintendent. "Degradation and byproduct formation in less than 30 days was often apparent. As NaOCl solution strength changed and residual fell below breakpoint, we'd get taste and odor complaints."

Also, New York State's requirements for chemical containment, delivery and off-



**To solve a number of problems plus gain efficiencies, Plainview Water District replaced its NaOCl systems with 10 Constant Chlor® Plus briquette chlorinators.**

loading – some of the most stringent in the nation – brought serious concerns. The district would soon have to provide comprehensive spill control measures at all of its sites, including \$20,000 permanent diking systems for off-loading tanker trucks. And, because commercial NaOCl is deemed a hazardous substance under state regulations, the district had to address issues of secondary containment in chemical bulk storage.

There were also O&M headaches. "NaOCl off-gassing would air-bind metering pumps, requiring unscheduled trips to the well sites." Granger says. "Plus, operators had to continuously monitor the solution strength and adjust dosage rates, due to the constant variability of chemical concentration."

**Two-Year Pilot Study**

A two-year study comparing the performance of the district's existing NaOCl systems to Constant Chlor Plus calcium hypochlorite briquettes and chlorinators showed these problems could be eliminated by switching to the new system.

"In our study, the Arch units provided far more consistent chlorine residual in the desired range," says Granger. "This meant fewer operator adjustments and the elimination of taste and odor complaints. Also, the briquettes have a 2-year shelf life, op-

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## Solid Chlorine Disinfection: Arch Spray Technology Ensures Consistency

Arch Chemical's patented Spray Technology is designed to produce reliable, consistently accurate calcium hypochlorite solution for drinking water and wastewater treatment applications.

Calcium hypochlorite is an extremely soluble material. Because of this, adequately controlling solution concentrations has been historically difficult. But now, Arch has designed an advanced feed system that works *with* the natural properties of calcium hypochlorite, to routinely achieve solution consistency within 0.1 to 0.2 ppm.

### Not An Erosion Feeder

The Constant Chlor® Plus spray feed system is markedly different from erosion feeders currently on the market. An erosion process dissolves material from the bottom of a tablet bed. The standard tablets, or "pill" shaped

calcium hypochlorite media, are relatively large and have sharp edges, leaving large spaces, or gaps, which can result in solution inconsistency and an uneven feed rate.

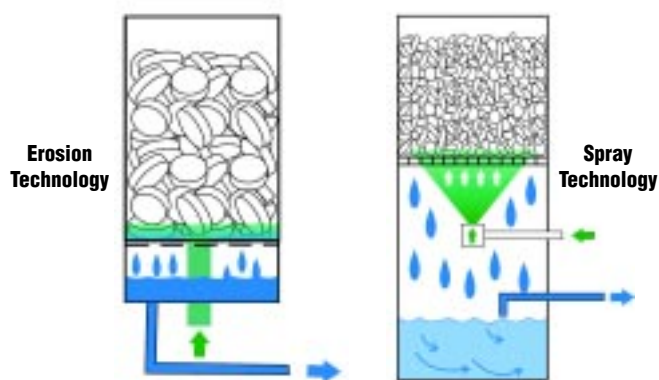
### The Answer: Spray Technology Plus A Well-Packed Bed

Arch Chemical's Spray Technology, together with its patented Constant Chlor Plus briquettes, have finally solved the consistency problem long associated with calcium hypochlorite use.

Supply water injected into the chlorinator sprays upward into a bed of briquettes. Due to the unique design of the briquettes, this short intermittent spray cycle contacts the entire bottom of the bed evenly, not just the material resting on the grid.



Standard tablets (left) are large and have sharp edges, leaving large gaps that can result in solution inconsistency. Constant Chlor® Plus briquettes, however, are relatively small and "pillow" shaped, for maintaining optimum packing in the spray bed.



Unlike an erosion feeder (left) Arch's Constant Chlor® Plus feed system sprays upward to a well-packed bed of briquettes, contacting the entire bottom of the bed evenly. Solution collected in a lower reservoir is continuously mixed.

Specifically designed for use in Arch's Spray Technology feed system, the briquettes are relatively small, smooth, and "pillow" shaped, for maintaining optimum packing in the spray bed.



Maintaining a well-packed bed of briquettes significantly reduces the potential for large voids in the spray surface that can result in inconsistent residual concentration in the final solution.

Calcium hypochlorite solution produced by the unit's short intermittent spray cycle is collected in a lower 60-gallon solution tank, where the total volume is slowly and continuously mixed, further enhancing concentration consistency.

The result? Just as its name implies – Constant Chlor. ■

To find out more about Constant Chlor Plus Briquettes and the Arch Spray Technology Feed System, simply fill out and mail the postage-paid reply card today.

### At Stanford:

## University Uses Constant Chlor® Systems For Booster Chlorination

Inadequate chlorine residual in drinking water distribution systems increases the potential for breakthrough of organisms and can ultimately result in serious public health and regulatory compliance problems. But maintaining sufficient residual, especially in outlying areas of a system, often presents major difficulties for water providers.

For three years, Stanford University has been rechlorinating its water with no difficulties. The University buys water from San Francisco and boosts the chlorine to maintain a required residual in the university's 100 miles of domestic water piping.



Stanford buys water from San Francisco and boosts the chlorine to maintain a required residual in the university's 100 miles of domestic water piping.

"We used to feed exclusively from a two million gallon (MG) reservoir and had experienced no chlorine residual problems," says Richard Souza, water operations supervisor. "But, when we built and started using a new 6 MG reservoir about three years ago to serve a portion of our system, we

found we lost 0.2 to 0.4 ppm between the time water entered the new reservoir and it reached us." The university must maintain a minimum of 0.2 ppm chlorine in order to verify the water has a residual. Souza says the residual in water from the new reservoir was near minimum levels.

### The Solution: An Accurate, Robust Rechlorination System

To restore adequate chlorine residual in these areas of deficiency, the university now uses Constant Chlor® Plus calcium hypochlorite briquettes and spray chlorinators from Arch Chemicals, Inc.

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The **ARCH Briquette**

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## Constant Chlor® Plus For Plainview Water District

(continued from page 2)

posed to commercial NaOCl, which began showing signs of degradation in less than 30 days." In addition, based on chemical solution strength (1.0 with the Constant Chlor Plus system versus 15 percent for NaOCl), the cal hypo solution is not subject to the state's chemical bulk storage rule or certain other requirements.

Following the two-year study, and with approval of the Nassau County Department of Health, the district switched to Constant Chlor Plus briquettes and chlorinators. Briquette chlorinators were installed on each of 10 wells at the district's six sites.

### Simple Installation, Small Footprint

The district performed the installations in-house, as well as the removal of the old NaOCl systems and

bulk storage tanks. The elimination of the tanks, together with the new feeder's small footprint (only 9 sq. ft.), has brought some much needed storage space to the district facilities.

"Installation was simple," Granger says. "After each feeder was set in place, it was just a matter of making a water connection using flexible tubing, plugging the unit in, and replacing the injector with one better suited for the application."

Granger reports that after three years of service, the chlorinators are performing very well.

"Our operators like them. Based on solution strength, they provide a reduction in potential hazards to operators and have eliminated numerous ongoing problems and concerns." ■

*Want to learn more? Simply return the postage-paid reply card to receive a detailed article reprint discussing Plainview's two-year pilot study.*

## Booster Chlorination At California University

(continued from page 3)

"I'd used gaseous chlorine in the past at well sites and didn't want to get into using gas again," says Souza. "Instead, we decided to use a system that would allow us to make our own chlorine on site and simply pump it."

The university installed two Constant Chlor® Plus calcium hypochlo-



**For three years, Stanford University has been effectively rechlorinating water using Constant Chlor® Plus briquettes and feed systems from Arch Chemicals, Inc.**

rite feeders to serve two distribution zones, adding 0.5 ppm chlorine before the water enters the campus system, which serves more than 24,000 people per day during the school year.

In addition to safety considerations, two other factors were important to Stanford – consistency and reliability.

"One big advantage is the steady rate of chlorine solution the units produce," says Souza. "Our chlorine residuals are very

## Answers To Frequently Asked Questions About:

### Constant Chlor® Plus Briquettes & Feeders

**Q.** What drinking water applications does the Arch system serve?

**A.** Constant Chlor® Plus Briquettes and feed system are an excellent choice to serve wellheads, booster chlorination stations and small to medium sized (up to 10 mgd) surface water treatment facilities.



**Q.** How are Constant Chlor Plus Briquettes different than standard calcium hypochlorite tablets?

**A.** They are different in two very important ways. First is their size and shape, which helps to maintain optimum packing in the spray bed (see related article, page 3). The second important difference is that Constant Chlor Plus Briquettes contain an inhibitor to reduce the potential for carbonate scale. Not all calcium hypochlorite media has this inhibitor. This provides for less frequent cleaning of the chlorinator.

**Q.** Does the Constant Chlor Plus Briquettes and feed system improve operator safety?

**A.** Yes. Based on chemical solution strength (1.0 percent for Constant Chlor Plus calcium hypochlorite versus 15 percent for commercial NaOCl), Constant Chlor Plus calcium hypochlorite provides a significant reduction in potential hazards for operating personnel.



consistent, and our two calcium hypochlorite feed systems have required only minimal maintenance."

Restoring bacterial control and adequate chlorine residual in areas of deficiency can be achieved through proper booster chlorination. At Stanford University, booster chlorination is being

successfully accomplished using Arch's Constant Chlor Plus briquettes and feed systems. ■

*To find out more about Constant Chlor Plus Briquettes and Arch Spray Technology for safe, efficient booster chlorination, simply fill out and mail the postage-paid reply card today.*

Constant Chlor® is a registered trademark of Arch Chemicals, Inc.



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**“Plainview, N.Y., Improves Water Quality”**

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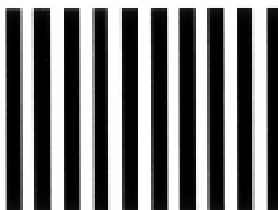
This article written by Plainview Water District Superintendent, Paul J. Granger, P.E., and published in the October, 2002 issue of *Public Works* magazine, outlines the district’s two-year pilot study comparing Constant Chlor® Plus briquette chlorinators to sodium hypochlorite feed. To receive a reprint of this comprehensive and timely article, simply check the appropriate box on the postage-paid reply card and mail today!



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