JCS Industries Inc.

Generating Great Chemistry Between Operators And Chlorine Dioxide

The use of chemicals has long been a crucial aspect of the water treatment process, dating all the way back to the ancient Egyptians. We've come a long way since, with chemical feed systems and generators representing the latest step in our progress. And even these are getting more precise and easier to use all the time.

To discuss the ways that treatment operations can utilize these systems, Water Online spoke with Brian Whitmore from JCS Industries, Inc. We asked about the role that chemicals play in water treatment, how operators can best meet regulations, and a new chlorine dioxide generator that can ensure chemical ratios are always on point.

Water Treatment Plant at Hanford's Waste Treatment Plant" U.S. Department of Energy, Office of River Protection © 2011 used under an Attribution 2.0 Generic license: https://creativecommons.org/licenses/by/2.0/

Before chemical feed systems were available, how did water systems introduce treatment chemicals into their feeds?

We think this is best answered by considering how chemicals were fed prior to automated systems. The answer is, of course, manually. Feed rates were manually set and adjusted throughout the day based on quantitative results. This method is still practiced today, but adjustments are based on qualitative information from analytical testing, analytical, meaning results based on manual bench tests.

With the evolution of feed systems, feed rates are now more accurate by using feed devices that automatically adjust to both the volume and quality of the water to be treated. Flow meters and analyzers aid in the ability to adjust chemical feed rates to the desired application rates that reduce excess feed.

What makes chemical feed systems so important to the water treatment process?

Automation is playing a greater role in the operations of water and waste facilities. In years past, chemical addition played a major role in producing water to meet federal and state regulations. Increasing regulatory requirements have led the industry to develop processes that rely more on the physical treatment, through things like membrane technology, to treat water while reducing the amount of chemicals needed for treatment. During this transformation, we have seen the fixed costs for the physical treatment increase and the costs of chemicals decrease.

How is chlorine dioxide vital to water treatment? What contaminants does it treat?

Chlorine dioxide is a very strong oxidant that has been around for years and has been used in many applications, such as

in the pulp and paper industry, oil field, and food and beverage industry. In water treatment, it is used for prevention of disinfection byproduct (DBP) formation, to improve taste and odor, and for iron and manganese control. It is also used for chlorine treatment credits for water treatment plants. Chlorine dioxide has been used to successfully solve issues for facilities that result in a higher quality end product.

What can be some of the complications with feeding chlorine dioxide into the treatment process?

Chlorine dioxide poses risks just like any other chemicals that are used in the treatment process. Chlorine dioxide is generated by mixing precise quantities of chlorine and sodium chlorite. Limits are placed on maximum residuals in the process as well as chlorite levels in the distribution system. Certain safety procedures are also required for spill management.

What components in JCS Industries' Model 4180 chlorine dioxide would you highlight? What roles do they play?

The JCS Model 4180 chlorine dioxide generator was designed to ensure that the chemical ratio is always maintained in a cost-effective and user-friendly way. This is accomplished by utilizing automatic control valves for the chlorine and chlorite to be mixed. We have based, the main control to be the chlorite feed which is measured by an electronic flow sensor. The chlorite feed rate then drives the chlorine feed while maintaining an accurate ratio between the two. If a fault is detected by either chemical, the system can automatically shut down and alert operations personnel of a failure. Most systems are manually adjusted, which can result in deviation from set rates from one routine check to another and create issues in operational efficiency.

Why is it important to be able to continuously adjust these chemicals based on chlorite feed rate?

Since regulatory agencies place limits on chlorite levels in the distribution system, we chose to make this the primary driver of the system. There is also the ability to further safeguard the operational efficiency by using a pH sensor to monitor the system. If the pH falls out of range, this means there is an imbalance in the process. Operations personnel can be alerted instantaneously, not two hours later.

How does the Model 4180 integrate with supervisory control and data acquisition (SCADA) technology?

The Model 4180 is set up to integrate into most SCADA systems for both monitoring and control. In my travels around the world, systems are going to remote monitoring and control at a faster pace. Increasing operational efficiency and reducing operational costs has always been the goals of utilities.

What type of treatment operations are the "target audience" for the Model 4180?

All treatment operations are potential users, in that we can employ our technology to assist operations personnel in maximizing operational performance for nearly any application.

What are some emerging technologies in chemical feed systems that you are excited about?

Developing electronic flow sensors for gas feeders that are economical and reliable to replace glass rotameter tubes. ■