

# Better Chlorine Control In A Cost-Effective Solution For Small Wastewater Plants

Just as treatment plants add chlorine to protect drinking water before it travels through the distribution system to consumers, wastewater plants treat effluent with chlorine as a final disinfection measure prior to its discharge into the environment. While perfecting the drinking water process can be tricky — for a variety of reasons, such as water age and disinfection byproducts — the wastewater process should be straightforward.

For many municipalities, however, this isn't the case. There are still a significant number of small wastewater systems (i.e., processing about 100,000 GPD) that dose their effluent using a manual rotameter.

The downside of this method is that the chemical feed is constant, treating the effluent stream with a set number of pounds of chlorine gas per day, based on the notion that applying the law of averages is a successful chlorine management strategy. In reality, the flow at these small plants will vary widely, so plant operators are likely overdosing, which is a waste of money, or underdosing, which can result in discharge where contaminants exceed permit limits and pollute local waterways. The latter could impact the environment and cause health problems for local residents as well as result in costly fines and bad publicity.



The good news is that small wastewater treatment plant operators have access to a cost-effective solution to those problems with automatic flow-based dosing.

## Building The Business Case

Operators of these small systems typically don't have a large budget, so cost is critical. It can be relatively inexpensive to convert to automatic flow-based dosing to control the chlorine residual when total operational costs are taken into account.

The JCS Industries Model 4200 Gas

Vacuum Chemical Feeder, for example, can pay for itself in less than two years just by trimming \$40 per week in waste caused by overdosing. Municipalities can plot an even faster payback on the investment by avoiding any regulatory fines from underdosing.

An additional consideration is the ability to handle surges during wet weather events. The automatic flow-based dosing equipment will be able to keep up with increased flow without an operator having to be present and engaged in the process.

As a result, those labor resources can be allocated elsewhere.

### Behind The Technology

The JCS Industries [Model 4200 Gas Vacuum Chemical Feeder](#) mixes and feeds gaseous chemicals commonly used for water and wastewater disinfection accurately, reliably, and safely. The system is composed of a vacuum injector to safely introduce the gas into the feedwater stream, a reversing servo motor coupled with a V-notch valve to regulate the chemical flow rate, and a control module for complete electronic control and communications.

Here's how it works: The water stream to be treated passes through the injector, creating a vacuum that provides the motive force to draw the disinfection gas to be fed through the entire system. The injector creates strong turbulence, rapidly and thoroughly mixing the gas into the

water stream. The chemical flow rate to the injector is regulated using an annular, tapered V-notch and orifice plate. The area through which the gas/water mixture can pass, and hence the chemical flow rate, is varied by moving the V-notch through the orifice plate, which is achieved by directly coupling a reversible servo type motor using a rack and pinion gear.

A microprocessor-based control unit oversees the controller and provides the user interface. The controller retransmits the valve position to any external device. It's easy to install the Model 4200 Gas Vacuum Chemical Feeder as a replacement for older technology, as it simply needs to be tied into the effluent flow meter.

Features of the Model 4200 Gas Vacuum Chemical Feeder include:

- A wide flow range: 0 to 4,000 pounds per day;

- High accuracy: +/- 4 percent of full scale;
- System flexibility through three control modes (Flow Proportional Control, Residual Control, Compound Loop);
- Leak-free;
- Battery backup more than 2.5 hours;
- Programmable microprocessor; and
- Multiple failure mode alarms.

The bottom line is that small wastewater treatment plant operators can take better control of their chlorine-dosing process with an investment that can be recouped in a relatively short time. ■