

# Chemical Feeders: A Guide To Successful Start-Up And Operation

Disinfection is essential to municipal water treatment — for both producing a quality product and meeting environmental discharge limits — but the dosing process can be expensive and tedious if not administered efficiently.

The problem is that a wide range of considerations play into equipment selection, system design, and operation to achieve optimal results. Failure to address any one of these factors can result in overdosing, underdosing, and unnecessary labor, all of which can drive up costs, impact customer satisfaction, and violate permit requirements.

By carefully evaluating key factors in equipment selection and operation, water and wastewater management professionals can ensure their systems are running as efficiently and effectively as possible.

## Manual vs. Automatic

The two most basic styles of chemical feeders are manual and automatic. Manual devices are cost-effective in situations where there is no need for a complex system, such as a well that runs at a constant flow rate. However, dosing becomes a trickier proposition in situations where varying flow rates are introduced, such as wastewater treatment plants, surface water plants, and wells with variable frequency drives.

When considering a manual system, it is critical to assess hidden costs, including the need to dispatch an operator to adjust the dosage rate when necessary; overfeeding, which wastes money on



excess chemicals; and underfeeding, which can lead to fines for permit violations. In the cases of over- and underfeeding chemicals, customers may also be upset with drinking water quality and wastewater environmental issues.

In older plants that were designed without automatic control in mind but have an influent/effluent flow meter, there is a significant opportunity to save on all those same costs by upgrading to a newer automatic feeder, which relies on a feedback loop.

When designing a new system or upgrading an existing system (beyond the simplest scenarios), switching from manual equipment to an automatic system will yield operational cost savings. However, a complete overhaul isn't always

necessary. For instance, a municipality that operates a well and later introduces surface water as a supplemental source doesn't need to replace the manual chemical feeder for the well, as long as the flow remains consistent. At the same time, it is probably wise, if not required by local regulatory bodies, to install an automatic feeder system for the surface water that likely has varying flow rates.

## Design/Installation Elements Tips

For vacuum-based systems, allow the hydraulics of the system to do the work for you by sourcing your motive water from a high-pressure zone, and then injecting your chemical solution into a low-pressure zone (i.e., distribution pressure to GST fill line, non-potable water pumps to chlorine contact basins). This can help avoid any problems of

inadequate water pressure that might be encountered with operating the system at start-up. Also, avoid sourcing and returning your motive water/solution to the same pressure zone, as doing this will require the addition of a booster pump, thereby increasing the energy and maintenance costs.

For metering pump systems, it is important to ensure the pumps are able to overcome the backpressure of the system while also sized to prolong the lifespan of the pump/tube (expected dosage to be ~60 percent of max dosage of pump).

Don't overcomplicate an installation by using more strainers and valves than necessary. If the motive water line is large enough to provide adequate water flow and pressure to all injection feed points, then the system will have an easier time meeting the design requirements. Adding

additional valves and devices before the final chemical injection point will increase the overall backpressure of the system, increasing the amount of energy it will take to get the chemical solution to its destination.

Before commissioning the system, make sure all fittings and tie-ins are airtight and that there are no vacuum, water, or chemical leaks. This might seem basic but failing to do so can cause significant issues. It is best to double-check or even triple-check these items in the start-up phase.

#### **Operations And Other Considerations**

When making the transition from a manual system to an automatic one, be aware of the learning curve and be prepared to master the system. And for maintenance, be diligent about following the manufacturer's guidelines for whichever technology you decide to

utilize. In most cases, annual maintenance kits are available to streamline the procedure.

Additionally, it may take time to trust something to run automatically that was previously done by hand. However, when these systems can run as designed, the benefits will materialize almost immediately.

Finally, make safety a priority when dealing with chemical feed systems by installing leak detectors and emergency shutoff valves for gas systems, as well as failure detection systems on metering pumps and chemical tanks, even if not required by law in your state.

If any of your questions about disinfection system configuration and commissioning haven't been answered here, please contact [JCS Industries](#) for further assistance. ■