

CUSTOMIZED CHEMICAL FEED SYSTEMS: AN ACCURATE, SAFE AND COST-EFFECTIVE SOLUTION FOR CHEMICAL DOSING IN INDUSTRIAL WASTEWATER PRE-TREATMENT





INTRODUCTION:

In typical wastewater treatment processes, there are several opportunities to introduce chemicals into the system to achieve the desired treatment goals. Chemical feed systems automate this process by injecting chemicals directly into tanks and pipelines for wastewater treatment. Chemical feed or dosing systems safely, reliably and economically release a precise amount of chemicals to keep a consistent amount of product in the water for effective treatment. By implementing automated solutions plants can optimize production efficiency, enhance worker/ operator safety and improve compliance within stringent permit requirements all the while increasing their bottom line.

As with most manual operations, manual feed systems are at a heightened risk of inaccurate chemical dosage when compared to automated counterparts. Whether chemicals are administered continuously via drip or intermittently according to a timetable, precision dosage is unreliable whether left to gravity or on-site operators. Continuous drips cannot account for changes in flow and thus are unable to maintain a consistent chemical concentration. Similarly, operators may be able to respond to changes in flow, but their interventions can fail to achieve optimal consistency. Furthermore, due to the nature of some chemicals common in industrial

wastewater treatment, frequent interaction with some substances may prove hazardous to operators' overall safety.

Workplace safety should always be at the forefront of any plants' operational protocols, but even in the safest environments accidents can occur. By automating chemical feed systems, one can reduce the number of occasions operators are required to interact directly with hazardous chemicals. Minimizing time spent in direct contact with chemicals can drastically reduce rates of mishandlings which may lead to injury. While fewer hands-on interventions may benefit employee health and safety, automating your chemical feed systems can prove to be cost-efficient as well.

Some of the costs associated with industrial wastewater are unavoidable, but careful investments can lead to savings across the board. Automating chemical feed systems reduces costs incurred by chemical waste resulting from manual dosing, as well as potential noncompliance costs in instances of insufficient dosing. Just one day of operational disruption due to wastewater treatment mistakes can equate to thousands in lost revenue. Minimize costly waste and mistakes by investing in a high-quality chemical feed system outfitted to handle the needs of your applications.



WHAT ARE CHEMICAL FEED SYSTEMS USED FOR?

Whether yours is a biological wastewater treatment system or a physical/chemical wastewater treatment system, both can benefit from the integration of chemical feed systems thanks to their wide variety of applications. At a glance, chemical feed systems can aid in the following pretreatment functions:

- Disinfection and/or Microbiological Control
- Flocculation
- Coagulation
- Defoaming
- Nutrient Removal
- Odor Control
- Corrosion and Scaling Inhibition
- Alkalinity Supplementation
- Chlorine Addition or Dechlorination
- Nutrient Addition
- pH Adjustment

To achieve peak functionality it is essential to ensure your chemical feed system has been expertly designed. Chemicals used in wastewater pretreatment come in gaseous, liquid and powdered or solid states. Depending on its form chemicals may require certain qualities or materials be used in the system's construction. If a chemical feed system is improperly designed, or if your facility is currently going without a system entirely, you could face several problems including permit violation issues, increased operational costs, increased maintenance costs and additional labor costs. Your plant could potentially overuse chemicals, thus contributing to safety issues, increasing chemical waste and potentially creating overall system performance issues. An issue in performance can lead to repairs and necessitate replacement parts. As a result, your plant could suffer downtime with consequences for the entire manufacturing facility. From wasted chemicals to permit violations, operational efficiency can be controlled and maximized through proper chemical dosing. Therefore the design, implementation and maintenance of a quality chemical dosing/feed is an essential component within any treatment facility.

CHEMICAL FEED SYSTEMS IN INDUSTRIAL WASTEWATER TREATMENT:

Whether your facility intends to discharge treated wastewater into the surrounding environment or send treated wastewater to a POTW for further processing, it must first meet a set of precise compliance standards. Failure to reach pretreatment standards can result in surcharges and significant fines in instances of damage to the surrounding environment or municipal treatment equipment. Fortunately, the implementation of chemical feed systems may minimize the likelihood of wastewater treatment systems incurring such noncompliance fines.

There are three major applications where chemical feed systems can optimize your facilities' wastewater treatment process:

- Pre-Solid and Liquid Separation
- Sludge Dewatering
- Water Disinfection and Microbiological Control

Despite its name, chemical feed systems are applicable in a multitude of wastewater treatment systems. As the following process flow diagrams demonstrate, both biological and physical/ chemical wastewater treatment systems can benefit from the introduction of chemicals at various stages in the treatment process. By utilizing a programmable chemical feed system within any wastewater treatment system, you can eliminate guesswork and close the dosing margin of error in your pretreatment process.



PHYSICAL/CHEMICAL WASTEWATER TREATMENT:

Within the physical/ chemical wastewater treatment process, there are multiple stages which require the introduction of chemicals to reach desired effluence [see: Figure 1]. Although the parameters are subject to change depending on the wastewater's intended use, next destination, or local regulations, the importance of meeting these standards cannot be overstated. As such, reliable and consistent chemical dosing is just one of many moving parts which can contribute to or hinder a facility's overall efficiency.

Several chemicals may be introduced during initial treatment, the variety of which could pose significant safety and handling challenges in manual feed systems. A programmable chemical

feed system can safely and consistently administer the correct amount of pH adjustment/ control, ORP control, coagulants and metal precipitants among other common treatment additives. Depending on the composition of your waste stream, your facility's treatment process may require the addition of flocculants either immediately post-treatment or later to aid in dewatering. By introducing programmable waste feeds you can be confident in timely flocculant dispensation. Concurrently, programmable feed systems could also be utilized to administer PH adjustment/ control once solid waste has been filtered from the wastewater stream as it progresses towards its next destination.

Physical/Chemical Wastewater Treatment

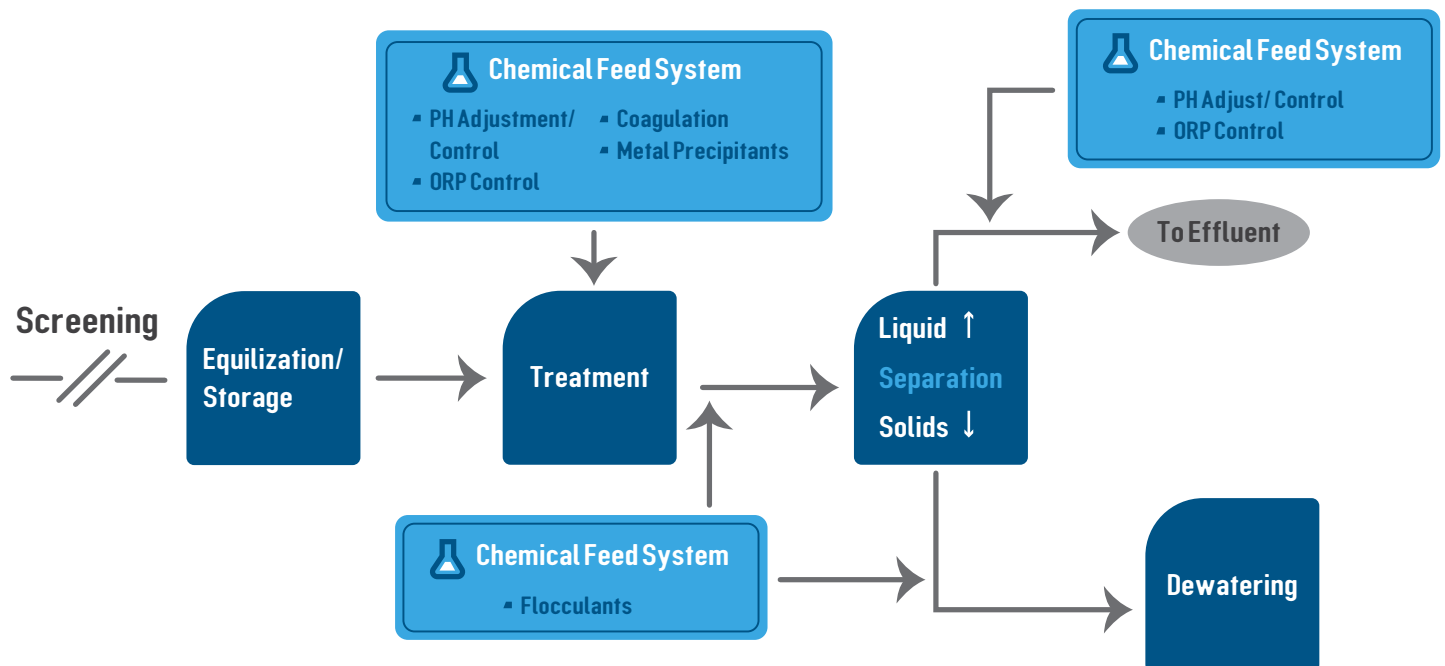


Figure 1. Applications of chemical feed systems within the physical/ chemical wastewater treatment process.



BIOLOGICAL WASTEWATER TREATMENT :

Throughout the biological wastewater treatment process there are several stages where the addition of programmable chemical feed systems could enhance efficacy and accelerate the wastewater treatment process. Depending on the waste stream's makeup, the biological treatment process may require the wastewater be subjected to any number of interventions.

From pH adjustment/ control, coagulants and/ or flocculants, different stages can require differing chemical concentrations. [see: Figure 2]. Additionally, once solid waste has been filtered out of the wastewater, chemical feed systems may be used to administer additional pH adjustment/ control, defoamer and fine-tune chlorination as necessary.

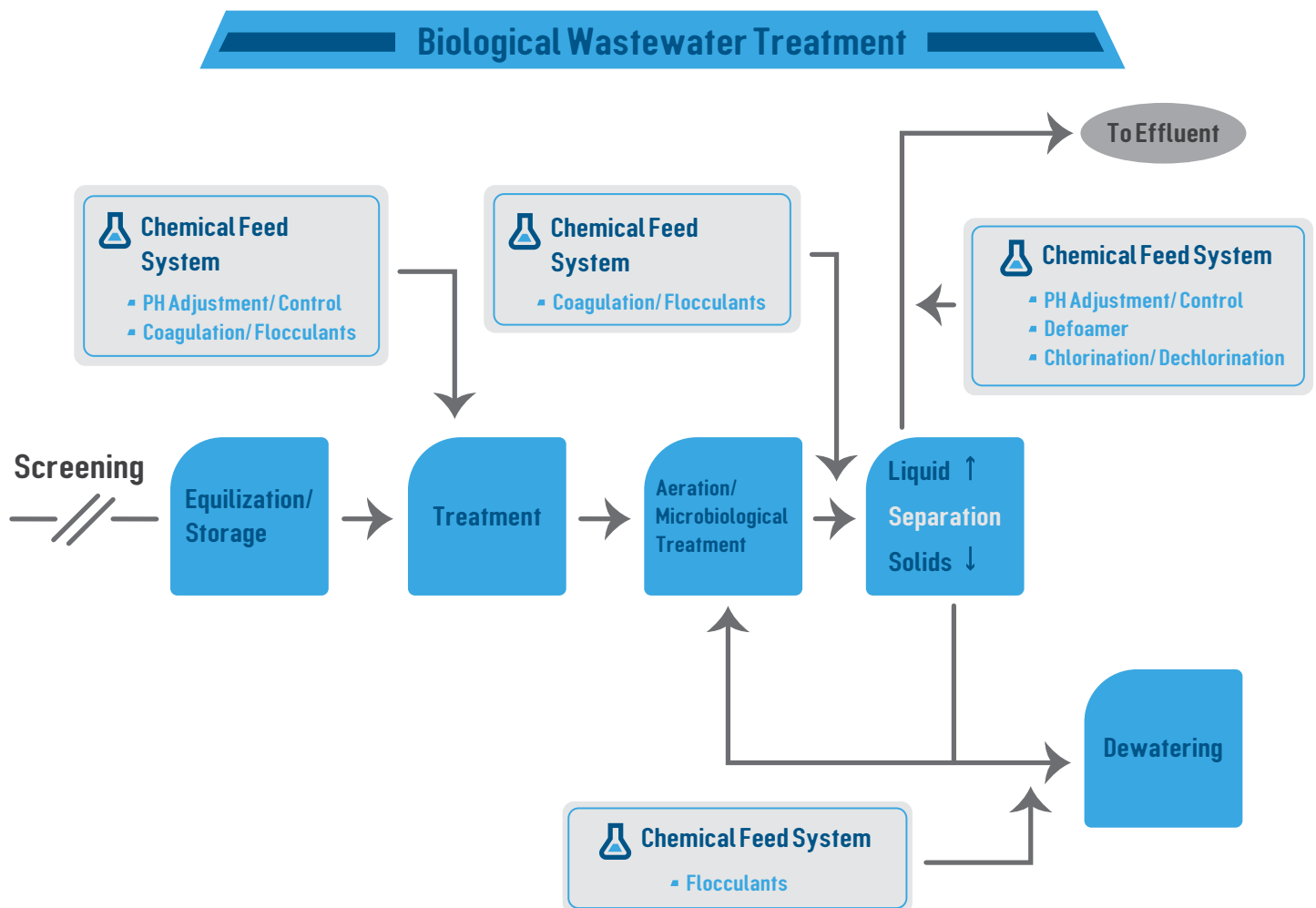


Figure 2. Applications of chemical feed systems within the biological wastewater treatment process.



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OPERATORS UNLIMITED AND CHEMICAL FEED SYSTEMS:

To achieve peak operational efficiency through the use of chemical feed systems, consult experts who possess the necessary insight, experience and expertise required to navigate the finer points of industrial wastewater treatment. Operators Unlimited specializes in the supply of chemicals, design and installation of components utilized in chemical feed and dosing systems, including pH and ORP (oxidation-reduction potential) controllers, custom automated metering pump skids for coagulant, flocculant, defoamers, metal precipitants and polymer flocculant make-down systems.

Our highly experienced engineers are equipped to maximize your return on investment by recommending specific components and systems based on your facility's waste stream makeup. From the initial onsite survey to the final calibration of controls and any maintenance needs, you can rely on Operators Unlimited to proficiently manage your system through startup and beyond.



OPERATORSUNLIMITED

Founded in 2001, Operators Unlimited, Inc. offers its customer partners confidence through efficient wastewater treatment and regulatory compliance, resulting in the freedom to focus on their primary business. No matter the service segments utilized, Operators Unlimited customer partners experience operational efficiency, cost predictability and process peace of mind for their industrial wastewater treatment facilities. For more than 20 years, Operators Unlimited, Inc. strives to make a lasting impact on its company, community and environment. Learn more at operatorsunlimited.net or follow us on Facebook, LinkedIn, Instagram and Twitter.

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