

Supercharge Your WWTP Effluent

“Six great reasons to consider ozone for wastewater disinfection”

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Supercharge effluent with ozone.



Most anyone reading this story is certainly familiar with the use of chlorine and/or UV for the disinfection of treated wastewater effluent. You're also probably at least somewhat familiar with the use of ozone for drinking water treatment. The purpose of this article is to introduce you to just a few of the benefits of using ozone in your next wastewater treatment project.

1) Highly Effective Disinfection

Ozone is known to be a powerful and effective disinfectant and has been widely used in drinking water treatment for nearly a century. It's strange then that ozone disinfection hasn't been more broadly adopted in wastewater treatment applications. This is especially true since ozone has potentially even greater benefits in these applications.

Ozone is an equally powerful disinfectant for wastewater applications. As would be expected, dosing is slightly

higher in wastewater applications than for drinking water treatment due to the higher background oxidant demand. As a general rule of thumb, a typical ozone dose for tertiary treated effluent would range between 4-8 mg/l. However, there are some very substantial treatment benefits from using ozone in this range and application, so read on.

2) Highly Oxygenated Effluent Disinfection

One of the "free" benefits using ozone in wastewater applications is a big increase in dissolved oxygen (DO) levels. In most new applications, ozone is generated and used at relatively high concentration, usually 8-12% by weight (BW) which, upon injection reacts and is consumed very quickly. The balance of the gas stream is nearly pure oxygen which also dissolves into the water to produce very high DO levels.

Plants discharging to surface water can greatly benefit

from increased effluent DO. Residual BOD / COD is less of a concern in receiving waters and overall water quality is generally improved. In cases where effluent is to be re-injected, super-oxygenation may require other process considerations, but on balance, overall effluent quality is improved.

3) Process Flexibility

Ok, here's where things start to get interesting for ozone applications in wastewater. Fundamentally, ozone is a chemical treatment process as performance generally follows stoichiometric ratios. Treatment performance is immune to issues such as color, turbidity, and transmissivity that can challenge UV based disinfection and other treatment processes. Rather than limit options, ozone processes actually give you more.

Overall, ozone is an extremely adaptable process that plays well with most any other technology. Many plants can benefit from installing an ozone system as a pre- or post- treatment step to another process. In the case of UV, ozone pre-treatment can remove color, increase UVT and help significantly improve the performance of an existing system. Similar performance increases can be seen in plants using activated carbon, conventional filters, or even membrane filtration. Ozone pre-treatment is easily adaptable to most facilities and can yield significant performance increases in BOD, COD, TOC, color, disinfection, and trace organics removal, such as those described below.

4) Lower Disinfection By-Products

An increased demand for water reuse, along with more stringent effluent standards is one of the biggest drivers for considering ozone treatment. Ozone can efficiently oxidize organic precursors to reduce or eliminate concerns with disinfection by-products (DBPs) such as THMs.

This is especially important for facilities still using or seeking to move away from chlorine-based disinfection processes. At facilities where a residual disinfectant is required, ozone treatment can significantly reduce THMFP by both



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removing organics before chlorination, and simultaneously reducing the total chlorine demand. At other facilities, ozone disinfection can altogether eliminate the need for chlorine-based processes. In either case, treated results benefit from lower levels of TDS, chlorine, and THMs and are much friendlier to the environment.

5) Removal of Trace Organics and Pharmaceuticals

By far the biggest advantage of ozone treatment in wastewater applications is the removal of trace pharmaceuticals, endocrine disrupting compounds (EDCs) and other trace organics. An ever growing body of research continues to show that ozone *is the best technology for oxidizing and removing trace organic compounds*.

Although only a few nations have passed rules limiting EDCs in wastewater, it is only a matter of time until such



Ozone treatment removes trace pharmaceuticals and endocrine disrupting compounds 50-100% more effectively than other competing technologies.

rules are more universally adopted. Here again, ozone is a great choice for plants that are considering upgrades to help meet future demands and compliance limits.

6) Its Easier (and Cheaper) Than You Think

Perhaps the biggest challenge in promoting ozone treatment is its perception across the industry. Although it has been available for decades, conventional ozone technology has earned a reputation for being difficult and costly to use, own, and operate. As a result, ozone treatment has largely been limited to just a handful of the largest treatment plants – those with the resources, staff and budget to maintain the system. This is truly unfortunate given the power and flexibility of ozone processes.

Fortunately, technological innovation has finally made its way into the latest generation of ozone equipment. Today's technology offers significantly enhanced reliability, lower maintenance, and lower operating cost than earlier generations. Many newer systems offer integrated process controls, extremely high turndown range, and dramatically increased power efficiency. Overall, engineering and operations staff will find that newer ozone technology can be easily incorporated into their facilities and can fit into almost any budget.

Best of all, new ozone technologies are no harder to operate and maintain than many chemical feed systems.

Many plants facing more stringent effluent limits and/or in need of disinfection performance should seriously consider ozone disinfection in their process evaluations. The benefits are greater, and costs are lower than you might think.

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