

Spiral Water's Suite of Advanced Automatic Self-Cleaning Filters



Spiral Water's product line.

Spiral Water's advanced automatic self-cleaning filters are designed to treat water with high and variable total suspended solids (TSS) across multiple industries. Spiral Water's niche is treating water with particles smaller than 50–75 microns and water with TSS above 500 parts per million (ppm), which is challenging for conventional filtration systems. Moreover, because they use a mechanical cleaning mechanism, Spiral Water's devices do not need to use water to flush their screens, resulting in water savings. The devices can be used alone or to complement existing filtration technologies. In this interview, President and CEO Gerard Lynch tells us more about the advantages and potential applications of Spiral Water's products.

Municipal Water Leader: Please tell us about your background and how you came to be in your current position.

Gerard Lynch: I have an engineering background and 30 years of experience in water conditioning and filtration testing, design engineering, and manufacturing operations. I am the president and CEO of Spiral Water Technologies. I also have my own design firm, Sigma Design, which develops new products and specialty systems for water treatment and marine environmental ballast water treatment. About 5 years ago, Spiral Water reached out for help with refining the launch and commercialization of its technology, which it had patented in 14 countries. I joined the board, and a few months later, I became president of the company.

Municipal Water Leader: Please introduce Spiral Water.

Gerard Lynch: Spiral Water Technologies develops and markets advanced automatic self-cleaning filters that are a game-changer when it comes to high solids separation and concentration. The company was funded by private investors with the goal of developing a unique high-solids water device to help solve water scarcity and water reuse issues and reduce TSS and nonhazardous discharge to rivers, lakes, and streams. We commercialized the technology, moved the company from San Rafael, California, to Middlesex, New Jersey, and redesigned the entire product line. Since the company started in 2015, it has deployed roughly 200 systems in the field.

Municipal Water Leader: What is the advantage of the advanced automatic self-cleaning filters you produce?

Gerard Lynch: All our technology uses a mechanical cleaning mechanism to keep the screens clean. That allows us to handle water with higher TSS than other systems can. Everything we build, design, and patent is intended to filter and concentrate water in higher-solids applications and to reduce waste. Most automatic filters in the market waste much more water than our products. They also struggle to deal with particles smaller than 50 microns or water with TSS above 500 ppm. That is our niche.

The heart and soul of our device is a rigorous cleaning mechanism that rotates at a rate of 50–1,000 revolutions per minute, cleaning the screen every 20 milliseconds. This prevents the buildup of a filter cake and allows us to run at a constant differential pressure drop. Low-micron filtration in high-solids applications with minimal water waste is what differentiates us from multimedia filters, sand filters, and self-cleaning backwash filters. Backwash filters, every time they clean, must reverse flow across the screen, which requires them to dump and waste hundreds of gallons of water.

Municipal Water Leader: How exactly does the automatic self-cleaning filter work?

Gerard Lynch: We take pressurized water at pressures from 15 to 150 pounds per square inch through the center of our cleaning mechanism, which rotates and spins the water out radially, creating vortices. These vortices create a turbulent and rigorous washing of the screen. Simultaneously, a helical auger wipes the screen clean every 20 milliseconds. We not only clean effluent filtrate down to sizes of 15–1,500 microns, we also concentrate the solids to a bottom purge chamber. When we purge, the 2½-second cleaning cycle uses about 3 gallons of water. That reduces water lost to waste by about 90 percent—up to 99 percent in some cases.

Municipal Water Leader: What industries do you primarily work in?

Gerard Lynch: Typically, we work in industrial wastewater, but our technology is also suitable for municipal wastewater treatment. Our products have applications that include food processing, wineries, agricultural technology and vertical farms, irrigation, biogas, wastewater treatment plant secondary effluent, pulp and paper, and distilleries. We reduce TSS, which removes some percentage of the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) in discharges, which is important in many industries.

Our first way to market was focused on wastewater treatment. We realized that water treatment plants cannot always expand in response to growth in industry and water discharge. They get to a point at which there is no more space to expand, with limited opportunities to increase capacity. To address this, we approached significant industrial users to help them reduce their discharges to their local wastewater treatment plants. If you can reduce point-of-use discharges to the wastewater treatment plant, you not only help the wastewater treatment plant, but you help industrial users reduce discharge service charges, which industrial users are charged based on their TSS, COD, and BOD discharge measurements. These substances are not necessarily toxic, but the U.S. Environmental Protection Agency has identified TSS as detrimental to clean waterways, so removing it also helps keep our streams and rivers healthier.



Two Model H1000s in Spiral Water's manufacturing plant, ready to ship.

We also treat secondary effluent at wastewater treatment plants. For instance, at the Sausalito Wastewater Treatment Plant, our Model 800 devices allow the reuse of secondary effluent while protecting plant sensors and washdown nozzles. Filtering variable-TSS secondary effluent at wastewater treatment plants to protect nozzles and sensors is an important use for our product.

Another important area is the use of these filters in renewable natural gas production—the production of biogas from landfills, livestock operations, and wastewater treatment operations. This is a new opportunity for us. Our technology is placed before an anaerobic digester, and it not only filters but concentrates and removes nondigestible solids as well as conditioning volatile solids before they enter the anaerobic digester. When solids go through the carefully

selected micron-size screen, anaerobic digesters have been shown to create 10–30 percent more methane in the same footprint in a shorter digestion cycle time. Because our filter cleans mechanically, it also removes nondigestibles, helping keep the anaerobic digester tanks cleaner and thus reducing operational expenses.

Finally, after more than 30 years of people talking about water reuse and water reclamation, we are seeing things start to take shape, and our technology is being implemented as part of many multistage filtration water reuse and reclamation solutions.

Municipal Water Leader: Who are your customers?

Gerard Lynch: We sell to and collaborate with system integrators and manufacturers of original equipment, such as moving bed reactors, dissolved air flotation devices, drum screens, and so on. We also sell our products business-to-business to industrial customers.

We have found that more original equipment manufacturers are saying, “How can I put your device in front of mine, so that our system will operate more efficiently?” or “How can I put your device after mine to better protect my customers?” These combinations have become a great asset for us. When we partner with organizations that have a solid understanding of their markets, we can help them build automated efficiency into their products with tremendous benefits for us both.

We bring new life to many products. I like telling the folks with whom we work in system design that drum screens, screw presses, and other water and wastewater treatment devices are not new, but taking the effluent from those devices down to 20 microns for water reuse is.

Municipal Water Leader: Would you talk about your Series 800, Series 1000, and High Solids Water Recovery (HSWR) systems? What are the practical uses for each and how do they differ from each other?

Gerard Lynch: Series 800 features our smallest models. The Model 800 was the initial unit developed by the venture team. Then we developed the Model 850, which is our latest small-size system. We have made sequential improvements along the way. For roughly 8 years, our Model 800s have been used in the Sausalito Wastewater Treatment Plant as point-of-use filters for sensors and washdown nozzle protection.

The Series 1000 is an answer to higher flow volumes. Whereas the 800 can handle 40 gallons per minute, the 1000 can handle up to 800 gallons per minute.

Our HSWR system is the result of a joint development with a major global filtration firm. We use a drum screen and a screw press and add our technology, typically Series 1000 filters, creating a unique system that can take water with up to 30,000 ppm of TSS and reclaim 95 percent

of it for reuse. We also concentrate the solids to discharge and remove TSS from that discharge.

Municipal Water Leader: How do you find new customers?

Gerard Lynch: In October, we attended the Water Environment Federation’s Technical Exhibition and Conference, known as WEFTEC, in Chicago. A lot of the people who had heard about us had never met us before. We had a full-scale product in our booth, and we were able to explain firsthand how it works and what makes us different. Sometimes, when you say that you have a self-cleaning filter, that simple statement lumps you in with about 65 other manufacturers from around the world. But once potential customers see and understand exactly what we’re doing, there is usually an *a-ha* moment, and the differentiation of our technology becomes clear.

Municipal Water Leader: How can new customers connect with you?

Gerard Lynch: They can learn more about us at our website, www.spiralwater.com. People can also e-mail us at info@spiralwater.com or call us at (732) 629-7553. We start internal reviews with our application data sheet to better understand the customer’s challenge. The better we understand the application, the better the solution we can provide. We also offer a free filtration audit. That is a great way for customers to learn more about the technology and helps define how we can best help them. People can also sign up for our newsletter if they want to learn more.

Municipal Water Leader: What is your vision for the future?

Gerard Lynch: The two main things that originally drove the creation of Spiral Water were the ideas of removing higher TSS and nonhazardous waste from natural waters and wastewater discharge. We then built on that idea to allow water reuse in water-scarce areas, such as California. We can address those issues with a specifically focused solution that has a small footprint and is automated and easy to use. It is an honorable endeavor, and we look forward to providing these benefits not only here in the United States, but worldwide. 



Gerald Lynch is the president and CEO of Spiral Water Technologies. He can be contacted at info@spiralwater.com.