

Ozone in the Residential Sector: A Discussion on Future Options

The use of ozone has typically been associated with larger commercial and municipal water treatment markets. Is that changing, and if so, in what way?

Over the years, the use of ozone in commercial applications has flourished and has become a vital and beneficial tool for many different applications, such as municipal water treatment, bottled water production, the commercial cleaning and packaging of fish, meat and poultry, commercial laundry and of course, swimming pools the world over. It has also been an expensive tool, however, and often very large and bulky, not providing the elegance required for the residential consumer.

The times are changing, though. Consumers are becoming more familiar with ozone and its disinfection capabilities and are asking for products that not only promote a healthier environment by reducing chemicals and natural resources, but also that promote a healthier life style. It is the consumer that has become the driving force of domesticating ozone technology, and manufacturers of ozone generation systems (and related products) are heeding that call.

Consumers are looking for ozone products to provide better oxidation of iron, manganese and hydrogen sulfide, and disinfection of microbes within their surface or well water supply. They are looking for cleaner and healthier alternatives for their backyard swimming pools and spas, without the foul odor that chlorine disinfection alone leaves behind. More and more people today are buying organic foods that have not been tainted by synthetic pesticides or other chemicals; they are looking for a chemical-free solution in the home to rinse their foods to provide disinfection and extend shelf life. At a time when manufacturers are striving to reduce waste and chemical use in commercial laundry settings with ozone, residential consumers too are looking to increase sustainability with the advent of residential-sized ozone laundry systems. Consumer reports have shown that poor indoor air quality is becoming an epidemic in today's homes. These homes are being designed to provide energy efficiency and built with better insulation and sealing, keeping in more airborne particulates, odors and allergens, which can also promote bacteria and mold growth. With the combination of in-duct HVAC UV-ozone and UV-germicidal light systems indoors, odors and microbes can be reduced, leaving a fresh-smelling home.

Safety is commonly thought to be a factor in using ozone. At the residential and smaller commercial level, what precautions for ozone use would have to be taken by installers and clients?

WC&P recently engaged Marc DeBrum in a conversation about ozone technology and its future in residential applications. These are his responses.

Safety is always a concern; however, safety-conscious ozone manufacturers provide built-in, fail-safe devices and have scaled the ozone production from their larger commercial predecessors to low, yet beneficial, residential levels. The US Department of Labor's Occupational Safety and Health Administration has determined exposure limits, which are cited in a time-weighted exposure for ozone of no more than 0.1 parts per million within an eight-hour period. Essentially, this means that working in an environment that exceeds an ozone level of 0.1 ppm for more than eight hours should be avoided. To further insure the consumer's safety, most ozone manufactures go to the extent of asking third-party companies to provide testing under real-life conditions to determine if the ozone of a specific product operates within these regulatory conditions.

As technological advancements are made, what do you think will be the result for ozone equipment manufacturers and water treatment dealers?

Commercial ozone systems certainly will not go away. In fact, I foresee the ozone industry growing as more industries are educated on ozone's many benefits. Water treatment and/or conditioning business owners are always looking for new, beneficial revenue streams or ways to diversify to sustain their businesses. With residential ozone systems, both increased revenue and diversification can be accomplished with customers to whom they have already sold a water treatment system. There are definitely reliability concerns with any product, whether for a commercial customer or domestic consumer. The key is purchasing products from a reputable company, one that has been in business for a long period of time, one that honors their warranty program, can provide third-party testing and documentation and can provide third-party certification for operation, function and electrical safety (such as UL, ULc and CE). If the customer does their homework, they will find reliable, domestic-based products that will surpass their expectations.

From the vantage point of cost analysis, how does ozone compare with traditional water treatment technologies in a residential setting?

Ozone is rarely the least costly alternative, when considering a bottle of bleach is very inexpensive; however, those who understand the benefits of ozone rarely choose ozone due to its up-front cost comparison. What ozone comes down to is quality of life. Ozone may cost more, but the benefits that it provides will certainly outweigh those up-front costs. Domestic ozone



systems certainly do not operate without some form of preventive maintenance. It is typical for those maintenance procedures to be outlined in the product's installation and operation manual, and should be completed to ensure proper operation and extend the life of the product. Dependent upon the product, service can be as simple as cleaning or replacing a filter, to replacing UV lamps or cleaning or replacing the ozone reaction chamber, most of which could either be completed by the owner or a trained professional.

- Ozone provides far better oxidation and disinfection of potable water, providing savings from less stain removal and other associated problems with household fixtures.
- Ozone provides disinfection of pool water without unwanted DBPs, odors and off-tastes, burning eyes, itchy skin and faded swimwear, for which chlorine is known. Correctly sized ozone systems can reduce chlorine cost and create a swimming experience where the chlorine is nearly non-existent.
- Ozone can now be produced to assist with odor control with residential laundry and also assist with oxidation of soils to produce cleaner, fresher smelling clothes in cold water, while saving on detergent use, water and energy.
- Ozone can provide a clean, sanitary work space in the kitchen, while also being FDA- and USDA-approved for use on foods, which can help to extend shelf life and save money by reducing food waste.

Ozone is created from oxygen. When that oxygen/air stream is moist from humidity, the combination of this moisture and the formation of nitrogen-oxide (NO₂) in the corona discharge reaction chamber can create nitric acid, which could increase the maintenance frequency of the ozone generator. This moisture in the air stream can be attributed by typical relative humidity, coastal fog or rain. As these factors increase and if the ozone system is located outdoors (where the air is not being conditioned), the correct air preparation system for the ozone generator and the application will help to reduce nitric acid production. The correct air preparation system for the humidity or moisture level in the air will also help the ozone generator perform at its specified peak output, as ozone output can be degraded by increased humidity and nitric acid formation. As the power input to the corona discharge reaction chamber (where the ozone is formed) increases and as humidity increases, so too does the formation of this nitric acid. For this reason, it is often the case that air preparation is used to reduce or eliminate the moisture content in the air stream, eliminating the concern of nitric acid. As ozone generators are reduced in size for smaller domestic applications, the power input to the corona discharge reaction chamber is also reduced, therefore proportionally reducing the production of NO₂ and the production of nitric acid. When determining the best ozone system, consult the manufacturer as to whether an air preparation system is necessary.

What is the biggest stumbling block to acceptance of ozone for residential water treatment use?

Ozone's largest barrier, in general, is education. Many may be familiar with ozone and its use with spas, as it has been used in this application for many years. Or perhaps they recognize the name because of its demeaning association with smog. A part of our job as manufacturers of ozone generation systems is not only to produce the systems, but also to assist with continued education. The ozone industry is in its infancy in regard to the general public's perception and understanding; however, this is a barrier that we will continue to break down.

What do manufacturers and dealers need to do to further educate prospective clients on the viability of ozone as a treatment option?

Manufacturers can provide the necessary education through articles such as this, technical papers, books, user success reports and seminars. This information should then be disseminated to dealers, who are able to educate consumers about ozone's viability as a treatment option throughout the home. In addition, with the Information Age upon us, we can use social media, such as Facebook or LinkedIn, to provide articles, Twitter for up-to-the-minute information on where the next trade show or seminar may be and YouTube to provide service and informational videos.

About the author

◆ *Marc DeBrum is the Assistant Sales Manager and Applications Engineer for ClearWater Tech LLC, a manufacturer of ozone systems for water purification in San Luis Obispo, CA. He is experienced in ozone application and design and has been in the ozone industry for 18 years. He can be reached via e-mail at mdebrum@cwtozone.com.*

About the company

◆ *ClearWater Tech LLC is an engineering, design and manufacturing company of ozone generation equipment, systems and components. ClearWater Tech has earned its industry-leading reputation through technical distinction in ozone generation applications for nearly 30 years. The company markets globally and has over 200,000 installations on six continents. Visit ClearWater Tech at www.cwtozone.com*

About the products

◆ *POE potable water treatment: www.cwtozone.com/index.php?page=problem-drinking-water; APEX Series pool water treatment: www.cwtozone.com/index.php?page=pool-spa-water-features; ActivTapp kitchen faucet: www.cwtozone.com/index.php?page=activtapp-faucet; CleanStart residential ozone laundry system: www.rainsoft.com/rainsoft-cleanstart/ and https://www.youtube.com/watch?v=_UqmndNIOBA&feature=youtu.be; AirWaves indoor air treatment: www.cwtozone.com/index.php?page=air-waves*

