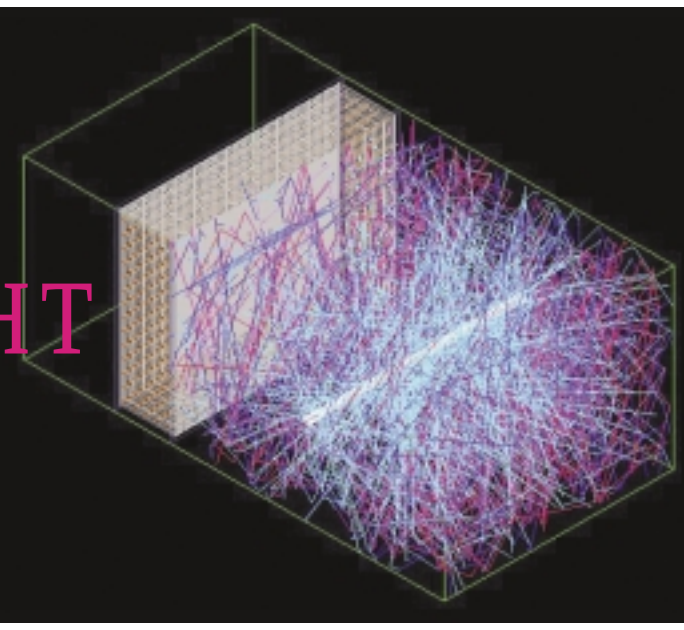
TECHNOLOGY UPDATE

By John Garrett, Biozone Scientific

Figure 1. Example of a ventilating system.

AIR PURIFICATION WITH ULTRAVIOLET LIGHT



A perfect fit for water treatment dealers

The water industry has been blessed with business opportunities spurred by the strong demand for pure water. While consumer demand has escalated for water purifying devices, it pales in comparison to what has happened in air purifying. The indoor air purification industry still is in its infancy, yet is recognized by the Environmental Protection Agency (EPA) to be a market valued well into the billions.

Example of a portable ultraviolet light air purifier.

The Chelsea Group, a market research organization specializing in indoor environmental issues, reported a high willingness by consumers to act on indoor air quality (IAQ) problems. This high interest is rooted in and supported by strong media coverage, government activity and personal experiences. The group's research showed that more than 80 percent of the employed full-time population would spend their own discretionary income on one of four IAQ improvements at home including products and services that would get rid of bacteria, mold, dust and odors, and to improve air quality in their homes. Some consumer reports say Americans are spending $10 million a day on products to improve the air in their environments. If consumers are spending that kind of money, maybe it is time to consider how you can get a little bit of it.

Is It a Fit?

Diversification often is important for the continued success of a business, particularly if there is a shared basis to the diversification. Over the last several years there have been a number of product/service extensions for water treatment dealers to consider. One such product/service extension that certainly deserves consideration and is gaining momentum is providing environmental improvements not just for water but also for air. Cleaning the air can be a natural extension and generate significant revenues to those that already are involved in the "purifying" business.

Is UV the Answer?

If adding air purifying as an additional profit center makes sense, then all you have to do is decide which kind of air purifying products you are going to sell. There are hundreds upon hundreds of air purifying device manufacturers out there touting a variety of air cleaning methodologies.

One method that seems to match well with water treatment dealers is ultraviolet (UV) light. Water dealers have seen an emergence of UV light technology as an answer to many water quality problems. Even though the first UV water disinfection system was used in 1909, we now are seeing a resurgence in its use for various water disinfection applications, and it is receiving ongoing attention in all water industry trade publications. While use of UV light

EPA's View on Air Cleaners

There are many types and sizes of air cleaners on the market, ranging from relatively inexpensive table-top models to sophisticated and expensive whole-house systems. Some air cleaners are highly effective at particle removal, while others including most table-top models are much less so. Air cleaners generally are not designed to remove gaseous pollutants.

The effectiveness of an air cleaner depends on how well it collects pollutants from indoor air and how much air it draws through the cleaning or filtering element. A very efficient collector with a low air-circulation rate will not be effective, nor will a cleaner with a high air-circulation rate but a less efficient collector. The long-term performance of any air cleaner depends on maintaining it according to the manufacturer's directions.

Another important factor in determining the effectiveness of an air cleaner is the strength of the pollutant source. Table-top air cleaners, in particular, may not remove satisfactory amounts of pollutants from strong nearby sources. People with a sensitivity to particular sources may find that air cleaners are helpful only in conjunction with concerted efforts to remove the source.

At present, EPA does not recommend using air cleaners to reduce levels of radon and its decay products. The effectiveness of these devices is uncertain because they only partially remove the radon decay products and do not diminish the amount of radon entering the home.

SCHOOLS, OFFICE BUILDINGS AND EVEN HOMES ACROSS THE COUNTRY ARE COMING DOWN WITH BAD CASES OF TOXIC MOLD. THE MOLD GIVES OFF TINY TOXIC SPORES AND, WHEN IT IS INHALED, ACTS AS A TRIGGER FOR RESPIRATORY ILLNESSES, HEADACHES AND ASTHMA. VARIOUS MOLDS ARE KNOWN TO PRODUCE ALLERGENS, IRRITANTS AND TOXIC SUBSTANCES. SOME MOLDS, KNOWN AS STACHYBOTRYS, PRODUCE EXTREMELY POTENT TOXINS THAT CAN CAUSE ANYTHING FROM SINUS INFECTIONS TO BRAIN DAMAGE.

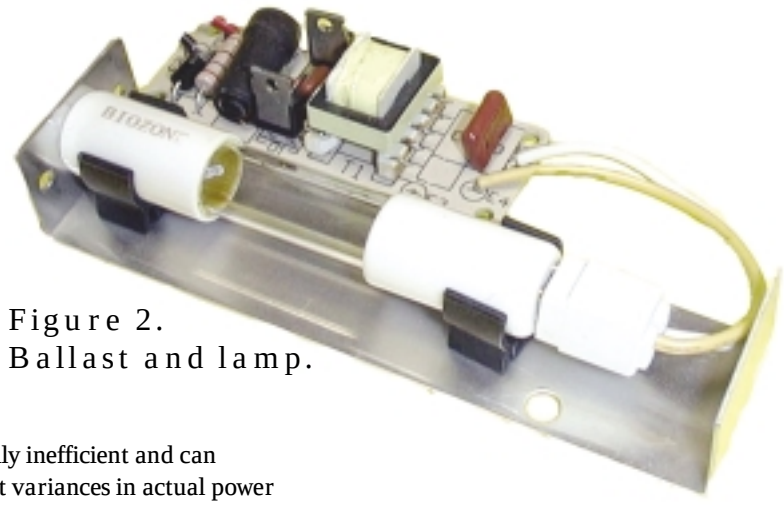


Figure 2.
Ballast and lamp.

for water treatment is becoming more and more popular, it also has been used successfully for air treatment for more than 80 years. Heating and air conditioning trade publications continually provide favorable accounts on UV's use. Professional periodicals such as the *Journal of Occupational and Environmental Medicine* report UV is safe and economical and can provide significant help with the fight against "sick building syndrome." UV light for air disinfection is approved by the Food and Drug Administration and recommended by the Center for Disease Control.

Because of the extensive coverage UV already has received in water dealer publications, it probably is not necessary to explain the scientific details of how and why it works, except to note that it works the same in air as it does in water. In essence, UV destroys contaminating organisms by photochemical damage to the DNA or RNA. In practicality, UV light inactivates microbes at a constant rate over time. How long it takes to inactivate microbes depends on the dose or power of the ultraviolet lamp. The higher the power or intensity of the lamp, the shorter the time period to destroy the contaminant.

Whether the ultraviolet lamp is in a portable air purifying device or installed in a ventilating system, the destruction of harmful organisms is directly related to the power of the lamp and the time period the organisms are exposed to the lamp. Exposure to the lamp actually means exposure to the lamp's radiant field. In a ventilating system (see Figure 1), the radiant field extends way beyond the lamp itself and can be intensified by the reflectivity of surrounding surfaces creating a vast "killing field." The same can occur in a portable unit. However, the farther away from the lamp the air passes, the less intense the exposure and, therefore, the less disinfection. Even so, the typical residential HVAC system recirculates air more than 50 times a day and the cumulative exposure to the UV lamp's power can be very effective in controlling biological contaminants.

New Development in UV Light

To make UV light even more effective in its fight against contaminants, some manufacturers are enhancing its power through improved science and electronics. One option is the use of ultraviolet lamps that also produce ozone. While the use of ozone is somewhat controversial, it can have a very positive effect on odor control as well as aid in the reduction of airborne volatile organic compounds (VOCs). Photocatalytic technology or irradiating a catalyst with UV light to reduce VOCs and biological contaminants also has become more popular. In addition, UV light can be the energy source for the creation of a photoplasma. Plasma has been reviewed well by the EPA as extremely effective in reduction of all types of surface and airborne contaminants.

No matter which UV air cleaning methods you wish to provide for your customers, an important key is the electrical power source used to drive the lamps. Traditionally, magnetic ballasts have been used to power the lamps. These are the same types of ballasts that are used to drive typical fluorescent lamps and have the same inadequacies. These types of ballasts are electrically inefficient and can provide great variances in actual power supplied to the lamp. Changes to the power being supplied to the lamp affects the lamp's output and therefore its purifying ability. As such, at any given time you do not know how well you are purifying. Today, there are electronic and solid state ballasts available that deliver consistent power to a lamp so that you are purifying at a constant high rate (Figure 2).

Market Potential

Markets for indoor air quality are tremendously under-penetrated. Consumers and businesses alike are looking for solutions to their air problems. Another fact from the Chelsea Group validated that point when they reported consumers want help in understanding how to improve their indoor air quality. This is the exact kind of service you now provide in assisting your customers in improving their water quality. So, find a good manufacturer of ultraviolet air purifiers—a manufacturer that uses advanced technologies, minimal requirements to get started, good dealer support and training programs and helpful marketing materials. See if you can get just a little bit of that $10 million a day by extending your purifying business into a market that is just waiting for your help and service. WQP

About the Author
John Garrett is president and CEO of Biozone Scientific, a manufacturer of air and water purification devices using lightwave-based technologies. Garrett holds several patents, has worked with major corporations and government agencies on air contamination issues, and has been a frequent lecturer in the United States and abroad on indoor air quality and ultraviolet light.

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