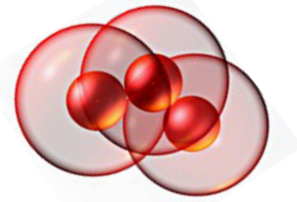


OZONE AND CHLORINE “THE DYNAMIC DUO”

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Ozone has been in use for nearly 100 years sanitizing water all over the world. It is nature's strongest oxidizer and has a by-product of pure oxygen. Chlorine is a very effective, time proven chemical but is ineffective against hard to kill microorganisms such as *cryptosporidium* and has some unpleasant by-products. Together they can compliment each other's strengths to combat today's challenging public swimming pools.

Ozone is created in nature when oxygen molecules are subjected to ultraviolet rays from the sun or by an electric charge from lightning. Some oxygen molecules are split into single oxygen atoms, which then combine with other O₂ molecules to form ozone (O₃). Man replicates nature to produce ozone in two ways: By forcing oxygen or ambient air past a UV light source or by sending a spark (a “corona discharge”) through an oxygen or dry air stream. Corona discharge systems create much more ozone at a higher concentration by weight than UV ozone systems, making them better suited for commercial and high volume residential pools and spas. Both types of ozone generators are highly reliable ensuring that a pool remains crystal clear.

Ozone reacts very quickly and is 100 times stronger than chlorine but has a relatively short half-life. Chlorine on the other hand has a long half-life, which acts as the long-term residual sanitizer in the pool basin. When sized properly, the swimmer will not detect any chlorine as the small amount required will all be “free available” and not combined with contaminants which create chloramines. Furthermore the pool water will have an Oxidation Reduction Potential (ORP) of over 700 with less than 1 ppm of chlorine. The water is as pure and clear as bottled water and safer than pools with chlorine only or combinations other than ozone and chlorine. There are several different sanitation methods for pools.

The most common types of sanitation are chlorine, bromine, ionization, UV, ozone, or various combinations of each.

Chlorine is the most widely used sanitation method, but it is quickly becoming less desirable because of the harmful by-products it produces and its difficulty to inactivate *cryptosporidium*. Chlorine is a relatively strong oxidizer and bactericide, but the problem is that it creates chloramines and trihalomethanes (THMs), which cause irritation to the eyes, skin, throat and lungs. Chloroform, a compound found in THMs, is a known animal carcinogen (cancer causing agent). Whether in liquid, gaseous, or solid state, chlorine can be a hazardous chemical to handle and swim in. Salt chlorine generation is another option for sanitation, but it is simply just another way of creating chlorine and produces the same by-products but eliminates the handling issues you have with liquid. Bromine is an alternative to chlorine and works particularly well in warmer water such as spas. The challenge with bromine is its overall capability to oxidize. Bromine is considerable weaker than chlorine and much weaker than ozone. However, for indoor applications with a light bather load bromine can be a good choice.

Ozone and Chlorine

Often times it is more effective to combine sanitation methods. Using ozone as the main pool sanitizer and chlorine as a secondary sanitizer is the ideal method for increasing bather comfort while decreasing hazardous chemicals and by-products. Ozone performs the heavy lifting in oxidation, while chlorine acts as a residual sanitizer. Using ozone in conjunction with chlorine is a natural, preemptive approach to preventing chloramines and providing superior water quality. Introducing ozone prior to chlorine reduces chances of combined chlorine (chloramines) forming. Ozone pre-oxidizes the contaminants that

form chloramines and oxidizes chloramines that have already formed. Not only does ozone prevent chloramines, which cause the “chlorine” smell associated with chlorinated pools, but it also eliminates the potential for cancer causing THMs. Using ozone with lower levels of chlorine will yield higher ORP levels and less chemical usage (both residual sanitizer and pH control) than any other sanitizer or combination there of. With the synergistic power of ozone and chlorine, dangerous microbes such as *cryptosporidium*, which have become resistant to conventional sanitation methods, are quickly and effectively oxidized. Ozone is more capable of destroying enteric bacteria, amoebic cysts, viruses, and spores than any other conventional sanitizers. This makes commercial and residential pools a safer environment for swimmers of all ages to enjoy. Another added benefit of using ozone as the “heavy lifter” is that it is a micro-flocculent, allowing the pool water to become visibly clearer providing a more pleasant swimming experience.

Another common combination of sanitizers for pools is using chlorine as the primary sanitizer and UV as the secondary sanitizer. UV is very effective at controlling microorganisms and uses very little space in the equipment room. However, the owner needs to be aware they will use 20% to 50% more chlorine because the UV consumes the HOCL just as the sun does and UV systems consume a great deal of power in the process. When shopping for a UV system be sure to select a system that is NSF approved, has an energy saving mode and is medium pressure.

Ozone and chlorine prove to be a “dynamic duo” that provides maximum microbe killing power and unparalleled water clarity. Most would agree that ozone is a worthwhile investment in bather health, safety, and comfort!



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