FACILITIES & MAINTENANCE

Optimizing Pool Water Treatment

BY DAVID VINSON, PHD

During the Olympic Summer Games, I gleefully watch any event of any sport—archery, table tennis, modern pentathlon, judo, basketball, even dressage, for which I have little to no understanding of the rules. I'm inspired by the spirit of competition, the drama, the triumph and heartbreak of witnessing a lifetime of dedication and sacrifice culminating in a span of minutes, seconds, or even fractions of seconds. Such moments are viewed globally, whether shared by patrons at a Reykjavik pub, a group of Tibetan highlanders, or perhaps a crowd that collects at a shop window in the Lower East Side of New York City, and I'm inspired by the idea that we are all united by the same experiences, even such fleeting ones.

Aquatics-based sports are uniquely appealing, and their appeal is amplified by what's at stake during the Olympic Summer Games. Perhaps I have been seduced as a viewer by the aesthetics, the contrast of the athlete whose body is taut and powerful, and yet so small upon entering the vast, shimmering pool. In diving events, there is the creak of the springboard, the impossibly precise twists and turns, and finally the splash which punctuates the athlete's efforts, ultimately determining the success (or failure) of the attempt itself. For swimmers, there is further contrast to enjoy, a stillness prior to the start, a nervous energy barely contained, one that explodes into chaos as limbs chop through water.

With the entire world watching, swimming pools utilized for the Summer Games must look immaculate and inviting. There is nothing like one in nature, with the exact dimensions, the aquamarine shine, and the perfect polish. From surface to floor, the pool remains

clear and clean, its temperature regulated for maximum comfort. Of course, private universities and colleges across the country host aquatics-based sporting competitions of their own, and with an understanding of best practices and the technologies needed, these institutions have worked diligently to reproduce the pristine standards of Olympic swimming pools.

The Challenges of Pool Water Treatment

Many people have enjoyed beautiful, inviting swimming pools, as well as the opposite—a pool with a high chlorine smell, cloudy water, base stained with grime. A pool left untreated has become infested with compounds known as chloramines. Known otherwise as "combined chlorine," the terms represent a family of compounds comprised of used chlorine that has combined with ammonia molecules after killing germs and oxidizing organic compounds, such as those found in urine, sweat, saliva, suntan lotion, among many others. Chloramines are the cause of the high chlorine smell. Ironically, pools that smell bad are not over-chlorinated; rather, they are under-chlorinated.

Not only do chloramines smell bad, but they are also corrosive and have the potential to cause everything from swimmers' teeth to problems in HVAC system ducts. More concerning, they're also widely associated with causing respiratory problems, particularly in highly frequented indoor aquatic facilities—an issue addressed by the Centers for Disease Control and Prevention, and also one covered in the Model Aquatic Health Code.

Service providers usually contend with chloramines in pools by shocking the water with large doses of chlorine to achieve "breakpoint chlorination," meaning that the residual of free-available chlorine has reached ten times the concentration of chloramines, in turn causing them to break apart by way

continued on next page

Private universities and colleges across the country host aquatics-based sporting competitions of their own, and with an understanding of best practices and the tech nologies needed, these institutions have worked diligently to reproduce the pristine standards of Olympic swimming pools.

of oxidation. The problem with this approach is that it requires the use of large quantities of chlorine or other shock treatments, and the pool must be closed during the treatment. This approach is also expensive and time consuming.

Technologies that Keep Pools Clean and Beautiful

Rather than treat chloramines after they have polluted the pool, a far more effective strategy is to address them prior to their buildup. Many pool water chemistry professionals advocate for using a combination of treatment technologies—corona discharge ozone systems, UV sanitation devices, and radically reduced chlorine levels. Corona discharge ozone systems handle the oxidation task, destroying organic compounds like chloramines that fuel the development of bacteria. The UV system shreds the bacteria, preventing it from mutating. The chlorine plays a supporting role as a constant sanitizing residual.

By using a combination of all three technology treatments, problems associated with high chlorine levels are eliminated; likewise, corrosive source water becomes much easier to manage. The ozone system maintains a constant oxidation-reduction potential (ORP), and so it oxidizes the unwanted compounds with reliable consistency. This process makes the ultraviolet transparency (UVT) of the water ideal for the UV system to destroy the harmful bacteria and prevent them from mutating.

Bugs and How to Kill Them

Pool water chemistry professionals are well aware of the presence of chlorine-resistant pathogens, namely the cryptosporidium, a nasty organism that has caused a number of outbreaks resulting in severe, even fatal, gastrointestinal problems. Especially for university swimming pools located outdoors, such outbreaks remain a concern. Chlorine does not kill the bugs, but the good news is that the organism is destroyed by properly sized ozone and UV systems.

Facility managers and servicers of private institutions' swimming pools must adopt measures to prevent an infestation before it happens. The financial cost of using ozone and UV system technologies offers significant return on investment in the form of greatly reduced chemical costs, both in terms of the very small volume of chlorine required and the reduced need for water mineral balance adjustment. Also, eliminating the presence of chloramines can greatly reduce the corrosion of materials that may surround the pool, leading to significant savings while also reducing the required air turnover rate.

Most importantly, those using the facility are breathing uncompromised air. The water quality generated by proper treatment with combined technologies, in addition to proper filtration regimens, becomes so appealing that it attracts rather than repels users.

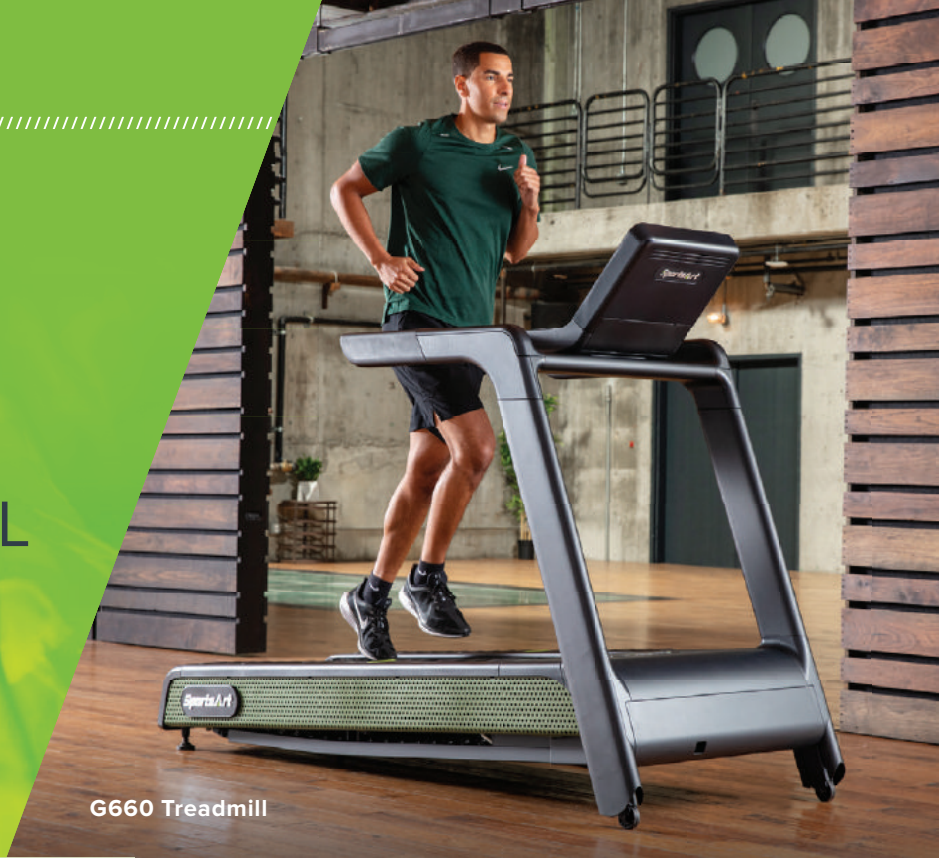
Learning from the Past at Yale University

In 2006, Yale University closed its practice pool due to concerns about how the water and air quality of the facility were affecting student-athletes. The administration discovered the facility had poor air circulation and high levels of chloramines in the water, which caused coughing as well as irritation to the eyes, noses, and throats of swimmers. During the closure, UV filters were installed in the water return-line to purify the pool's contents. Four new fans were added in the room to enhance air quality, and the university commissioned an architect to evaluate the improved conditions. The changes were successful, leading to a 75% reduction in chlorine use, and to improved water and air quality. It is key to note that the addition of UV filters, in particular, were not a temporary fix but rather a permanent, cost-saving solution to a potentially serious health-related concern.

ABOUT THE AUTHOR: Dr. David Vinson has a PhD in English with specializations in transatlantic literature and cultural studies. He is a committed scholar, teacher, and dad. If you ever meet David, avoid the subject of soccer. His fandom borders on the truly obnoxious.

SportsArt

HERE'S SOMETHING YOUR TREADMILL CAN'T DO.


G660 Treadmill

THE ECO-POWR™ G660 TREADMILL ISN'T JUST ENERGY-GENERATING—IT'S CARBON NEGATIVE.

More than a decade ago, SportsArt showed our commitment to customers, communities and our shared world with ECO-POWR™. Now we add another industry first. Over its expected life cycle in a typical commercial facility, the G660 will produce enough clean energy to offset more carbon than its certified footprint.

Discover how carbon-negative cardio makes a positive impact for you and your members.