

What to Know About Cyanuric Acid

Let's take the confusion out of this water treatment product once and for all

By Nick Rancis

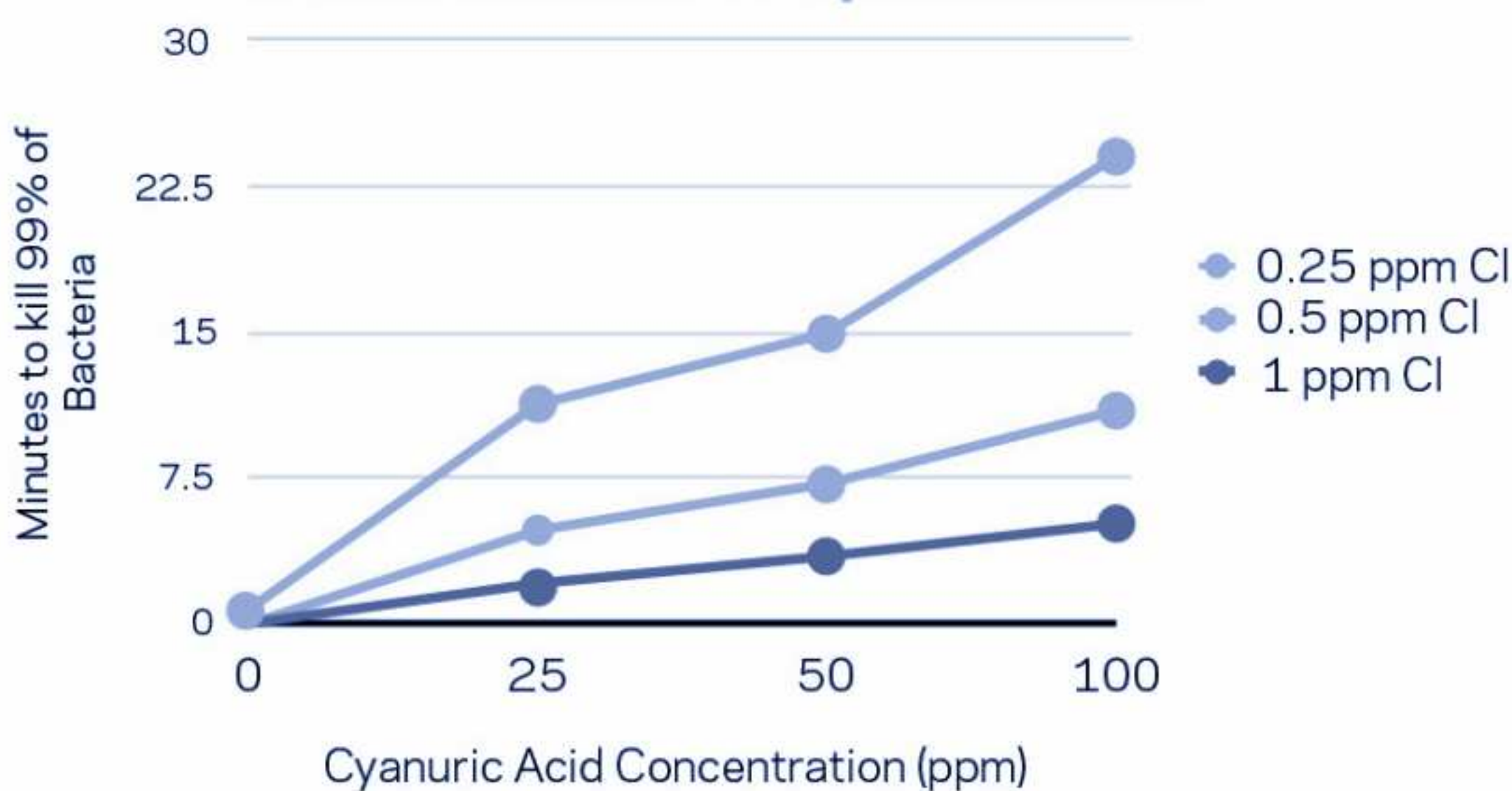
A common household name, cyanuric acid now is in the toolbox of most residential and commercial service professionals who maintain outdoor pools.

Since its invention in 1829, CYA has been revered as invaluable and essential to keeping chlorinated pools clean and sanitary. At the same time, scientists and lawmakers are pointing out that cyanuric acid's dangerous misrepresentation and overuse in pools can lead to serious public health and pool-maintenance issues. To further complicate the issue, some health inspectors insist on the use of cyanuric acid, while others restrict its presence in public pools. Why the industry polarization? Let's take a deeper dive on the benefits and misconceptions of CYA.

Cyanuric acid technically is an 'acid' but is dissimilar to muriatic acid, which the pool industry uses to manage and adjust pool pH levels. It is sold as a standalone product or can be purchased as a convenient additive to chlorine tablets. It is able to dissolve in water and has little overall effect on pH, alkalinity or hardness. Unlike other 'acids,' it is commonly referred to as a chlorine stabilizer or conditioner, forming a chemically weak and temporary bond with chlorine. This means it will hold onto free chlorine in the water, reduce chlorine's strength and, most importantly, protect chlorine from the sun (through cyanuric acid's ability to absorb UV light) until the chlorine is consumed for oxidation or disinfection of material in the pool.

Primary benefits

Estimated Time (minutes) to Kill 99% of Bacteria in the Presence of Cyanuric Acid



Data for this chart comes from Anderson, J.R., "A Study of the Influence of Cyanuric Acid on the Bactericidal Effectiveness of Chlorine," American Journal of Public Health, Oct, 1965.

A chlorinated pool with cyanuric acid will remain chlorinated in direct sunlight; whereas, without a stabilizer, chlorine will dissipate and leave the pool unprotected without free chlorine in a matter of hours. Most importantly, cyanuric acid will not be consumed and will, over time, build up in pool water.

Cyanuric acid has many extraordinary benefits for the pool industry. It has allowed the typical homeowner, HOA and pool service professional to manage a pool's water chemistry with less effort and higher consistency. Allowing for weekly water maintenance instead of daily has created an opportunity for service companies to take care of more pools with less hassle and emergency house calls (algae, etc.).

Overall, the market for cyanuric acid has exploded, creating a \$300-million-a-year business. Unfortunately, the misconception of "if some is good, more is better" has perpetuated throughout the industry and could not be farther from the truth. Let's investigate the practical science of why this is the case and why the importance of cyanuric measurement is critical in keeping pools clean and safe.

Consequences of high CYA levels

Chlorine's potential to oxidize, often measured as oxidation reduction potential (ORP), is a good indicator of chlorine's effectiveness.

Over the years, numerous independent and academic research initiatives have shown that when cyanuric levels build up in the pool, ORP levels consistently drop, indicating that the effectiveness of chlorine diminishes. In addition, there is a clear correlation between increased levels of cyanuric acid and the time it takes to effectively kill bacteria present in pool water.

Furthermore, at high levels of cyanuric acid, chlorine is rendered ineffective in killing the most dangerous microorganisms in the water: *Cryptosporidium parvum*.

Cryptosporidium parvum, or crypto, is a chlorine-resistant microorganism that causes gastrointestinal illness, similar to that of *Giardia*, which reproduces in the gut of humans.

Crypto has a strong and durable outer shell that allows it to survive outside the human body. It is spread through drinking water or swimming pool water, and is tolerant to a wide range of chlorine concentrations.

Every year, thousands of documented cases of cryptosporidiosis occur in public pools, mostly originating from fecal matter. When a suspected case of crypto occurs, the Centers for Disease Control and Prevention recommends a free chlorine concentration of 20 ppm for 32 hours to inactivate 99.9 percent of crypto in the pool (CT=15,300 mg*min/L).

However, the CDC recommendation does not take into account the level of cyanuric acid usually present in outdoor pools.

Recent CDC research presented at the 2015 World Aquatic Health Conference demonstrates that, even at CYA levels as low as 10- to 20 ppm under hyperchlorinated conditions, the current recommended remediation protocol is not adequate to inactivate the necessary 99.9 percent of crypto in pool water. It also concludes that additional methods and secondary sanitation systems to protect swimmers from fecal accidents are desired.

Moving forward

Responsible training and education on the benefits and misuse of cyanuric acid is critical. Poolside kits that can accurately test for CYA are available commercially but are underused or not used at all.

What happens when your cyanuric acid level is too high? It is simple — the only reliable method for removing CYA from swimming pools is through draining/dilution or removal through reverse osmosis.

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