Cyanuric Acid Removal - Alum Floc

onBalance – Que Hales, Doug Latta and Kim Skinner

The major loss of chlorine in outdoor swimming pools is due to the breakdown by ultraviolet sunlight, with subsequent off-gassing. Cyanuric acid is used in these pools because of its ability to shield chlorine from this photolysis. This benefit may be offset by a slight but measurable decrease in the rate of algacidal and antimicrobial activity, and a downward shift in the calcium carbonate saturation index. Historically excess (>100ppm) cyanuric acid concentrations have been addressed by dilution (draining part or all of the water from the pool and replacing it with fresh water). There is now a need for more conservation-conscious alternatives that do not involve the water loss associated with draining. This series of papers presents our evaluation of some of these methods.

As developed and promoted by Rudy Stankowitz of Aquatic Facility Training & Consultants in Florida, this method is based on the flocculation properties of aluminum sulfate and the purported complexing of cyanurate with aluminum ions. As provided by Mr. Stankowitz, the method is as follows:

1. Adjust pH to 7.0 (Critical)
2. Adjust Total Alkalinity to 80 to 120 ppm, Calcium Hardness to 200 – 400 ppm, Water Temperature to 70º to 90º (Critical)
3. Ensure the pool is free of heavy debris that could stir the 'Floc' upon vacuum to waste.
4. Test Cyanuric Acid Level.
5. Filter Preparation
    1. Sand & DE Filters: With the pump off, manipulate the multiport valve to 'Recirculate' position.
    2. Cartridge Filters: With the pump off, remove the filter element and then reassemble without it.
6. Broadcast Aluminum Sulfate at a rate of 8.33 lbs per 10,000 gallons of water.
7. Set time clock to run the pump for two hours and then shut off.
    1. Remove the 'ON' tripper from the time clock to avoid unintentional circulation.
8. Allow the pump to remain off for a minimum of 12 hours. Do NOT allow the pump to run again until the entire process is complete and elements replaced with valves in the correct run positions.
9. With a PORTABLE VACUUM SYSTEM, vacuum the floc to waste at a pace slow enough not to stir or 'break' the floc.
10. Test residual aluminum level (should be < 0.2 ppm)
11. Test Cyanuric Acid level.

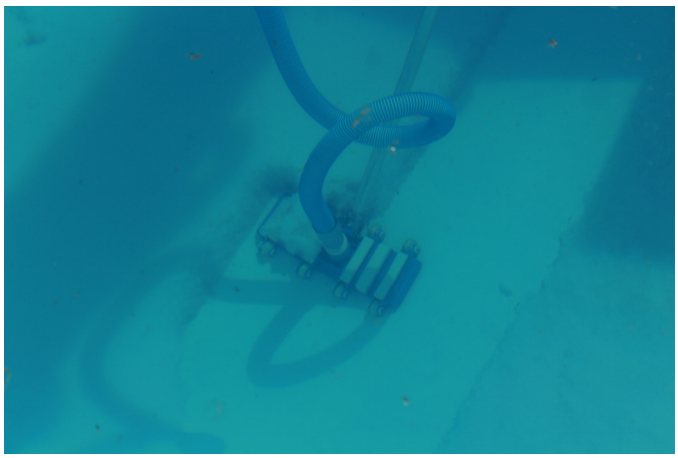
Points of interest:

- When onBalance evaluated this method in our lab, we were able to achieve approximately 15 to 20% reduction. When evaluated in the residential pool environment, where the process included floc and water removal/replacement in the "vac-to-waste" process, we were able to achieve a 25% reduction in CyA.
- Mr. Stankowitz and others have reported higher reductions, including reporting up to 50% reductions. Environmental and chemical factors may have varied in those pools.

Strengths: Speed (about a 24-hour process), simplicity
Weaknesses: Expertise and equipment in the vac-to-waste process. Chemistry and temperature dependent. Some water loss. The limited amount of removal compared to other available methods.

Flocculation Using Alum

Vacuuming to Waste



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