

THE SCIENCE OF SWIMMING POOL MAINTENANCE AND OPERATION

Keep your pool looking beautiful for years by following the water balance procedures recommended by your pool surface manufacturer, pool builder, pool dealer, or service company as follows:

Operate the pool's filtration system for an adequate length of time. Foliage, heavy bathing loads, screen enclosures, and rainy seasons *must* be taken into consideration. Under extreme environmental conditions and depending on the type of filter a good rule is:

1. Operate the filter system at least 2 hours beyond the rainy time of day. Allowing the filter to do most of the work trapping organic and inorganic matters requires less sanitizer (chlorine) and helps keep the water balanced. It also reduces the build up of by-products different sanitizers add to the pool water reducing the need for fresh water.

Diatomaceous Earth (DE) filters	8 - 10 hours
Cartridge filters	10 - 12 hours
Sand filters	12 - 15 hours

Increased filter runs will be required under extreme environmental conditions. It is cheaper to operate the filter system than it is to correct a pool problem with chemicals. Fresh water and good filtration is the key to maintaining swimming pool water in a tropical environment.

2. Maintain water balance parameters:

Free available chlorine (FAC)	1 to 3 parts per million (ppm)
Combined chlorine	0 ppm
Total available chlorine (TAC)	Equal to free (represents 0 ppm combined)
pH	7.2 to 7.6
Alkalinity	80 to 120 ppm
Calcium hardness	200 to 400 ppm (<i>exposed aggregates 250 ppm maximum</i>)
Metals	0 ppm
Cyanuric acid (stabilizer)	Below 70 ppm
Total dissolved solids (TDS)	Below 1200 ppm (<i>or no more than 800 ppm above fill water</i>)

Note: Pools with chlorine generators should not exceed approx. 3,500 ppm TDS

Caution: High stabilizer levels inhibit chlorine's ability to work effectively, requiring higher Cl ppm levels. This results in over feeding of chlorine causing yellow and/or brown stains on the pool surface and fittings. Chlorine residuals maintained above 4 ppm will oxidize the inside of heaters resulting in discoloration of the pool surface.

Make-up/fill water and water balance products contain contaminants in some form or another. Metals/minerals also make their way into the pool through the use of lawn treatment chemicals. These metals/minerals may come from your yard, neighboring lawns, golf courses, etc. Metals, as contaminants, will stain your pool if water balances are not maintained. Rain can upset the balance of pool water.

High pH above 7.8, high alkalinity above 120 ppm, or high calcium levels above 450 ppm will cause a saturation problem and drive metallic contaminants from the water resulting in stains and discolorations. A good analogy would be like comparing ice tea to swimming pool water. Addition of sugar into tea can be made only to the point that the ice tea can absorb the soluble sugar. Ice tea reaches a saturation point where as more sugar is added to the tea other sugar falls to the bottom of the glass. *Calcium hardness for exposed aggregate finishes should be maintained below 250 ppm. Dilution is the low cost solution!*

Low pH will etch the pool finish and damage the pool equipment usually resulting in pool surface stains and discolorations. Note: Be careful not to over sanitize with low pH sanitizers.

Low alkalinity allows the pH to swing up or down causing aggressive or scaling water depending on the pH of rain and sanitizers. This can result in damage to heaters and cause pool surface stains and discolorations

Low calcium hardness will create aggressive water. This can etch the pool finish as well as cause aggressive water that will strip metals out of heaters, gate valves, or any other metallic components the water comes in contact with as the pool is circulating. This too will result in pool surface stains and discolorations.

Pool water chemistry is based on scientific principles. Accurate testing and minimal adjustments must be made depending on the pool environment. There is no substitute for fresh water and good filtration when it comes to pool operation. Accurate and complete water testing regularly is essential.

Add a Quality Sequestering Agent upon initial fill, 1 quart per 10,000 gallons and always 4 to 8 ounces when adding water and water balance products. Following the above instructions will help prevent yellow etch spots, red or yellow stains, bluish, gray and/or black discolorations from appearing on the pool surface.

Note: 3-inch tablets triple in solubility when the temperature of the water increases from 77°F to 90°F. Use one (1) 3 inch tablet per 10,000 gallons per week. Make minor adjustments when necessary with liquid chlorine or calcium hypochlorite. Hartford loops should be installed when in-line Trichlor feeders are used. Floaters should be tethered in the deepest part of the pool. Always pre-dilute water balance chemicals in a 5-gallon bucket of water before adding to the pool. Never add water to chemicals, always add chemicals to water! Electrolytic and catalytic sanitizers and bactericides should not be installed until the alkalinity and pH have stabilized usually at the 28 to 45 day initial cure.

Signature: _____

Date: _____