



WATER CHEMISTRY GUIDELINES

The following list details the proper water chemistry levels for optimal swimming pool functionality and comfort (FOR VINYL-LINED POOLS ONLY):

pH: 7.2 - 7.8

Chlorine: 4.0-7.0 ppm

Total Alkalinity: 100-150 ppm (After the cyanuric acid level is deducted)

Calcium Hardness: 200-350 ppm

Cyanuric Acid: 25 – 100 ppm (65-100 for chlorine generator pools)

Salt: 3,000-3,5000 ppm

Phosphates: 0-500 ppb

Water Balancing

Water balancing is not a complicated exercise. It is simply the relationship between different chemical parameters. Your water is constantly changing, year round. Everything from weather to oils, to dirt and cosmetics, affect your water balance. You will probably not change the water in your pool for many years. Continuous filtration and disinfecting removes contaminants which

keep the water enjoyable, but it does not balance your water chemistry. A pool that is balanced has proper levels of pH, Total Alkalinity, and Calcium Hardness. It can also be defined as water that is neither corrosive nor scaling. This concept is derived from the fact that water will dissolve and hold minerals until it becomes saturated and cannot hold any more water in solution.

When water is considerably less than saturated, it is said to be in a corrosive or aggressive condition. When water is over-saturated and can no longer hold the minerals in solution, it is in a scaling condition. Balanced water is that which is neither over nor under-saturated. The cliché that “water seeks its own level” certainly applies here. Water that is under-saturated will attempt to saturate itself by dissolving everything in contact with it in order to build up its content. Water which is over-saturated, will attempt to throw off some of its content by precipitating minerals out of solution in the form of scale. How do we know when our water is over or under-saturated? We use a good test kit to measure the chemical parameters of pH, alkalinity, and calcium hardness.

pH

pH is a measure of how acidic or basic the water is. pH is a logarithmic scale from 0-14, with 7 being neutral. pH values below 7 are defined as being acidic; while levels above 7 are said to be basic (or alkaline). Everything that enters your pool has a pH value. For instance, acid rain is rainfall with a very low pH. Then there's the human eye with a pH value of 7.35, which is just slightly basic. This is, coincidentally, in range with proper pH levels for your pool. To have pH in balance we adjust the water with additions of pH increasers (bases) or pH de-creasers (acids) to achieve the range of 7.2 – 7.8. If your testing (which you should do weekly) of the water indicates a pH value below 7.2, the water is in a corrosive (acidic) condition and you will need to add a base to bring the pH into a more basic range to prevent corrosion. Conversely, if the pH is above 7.8, we are in a scaling (basic) condition and must add an acid to bring down the pH to prevent the formation of scale.

Total Alkalinity

A close cousin of pH, the level of alkalinity in the water is a measurement of all carbonates, bicarbonates, hydroxides, and other alkaline substances found in the pool water. pH is alkaline dependent: that is, alkalinity is defined as the ability of the water to resist changes in pH. Also known as the buffering capacity of the water, alkalinity keeps the pH from bouncing all over the place.

Low alkalinity is raised by the addition of a base (similar to pH). High levels of alkalinity are lowered by the addition of an acid (similar to pH). Experts recommend pooling the acid in a small area of low current for a greater effect on alkalinity. That is, adding an acid will lower both pH and alkalinity. Walking the acid around the pool in a highly distributed manner is said to have a greater effect lowering the pH than the alkalinity. Pooling the acid has the opposite effect. A very important component of water balance, and levels should be tested weekly.

Calcium Hardness

When we speak of scale, we are talking about calcium carbonate that has come out of solution and deposited itself on surfaces. It is a combination of carbonate ions, a part of total alkalinity and calcium, and a part of the Calcium Hardness level. The test for Calcium Hardness is a measure of how hard or soft the water is when it's tested. Hard water can have high levels of calcium and magnesium. If these levels are too high, the water becomes saturated and will throw off excess particles out of solution that then seek to deposit on almost any surface inside the pool. This is calcium carbonate scale: a "white-ish," crystallized rough spot. If the levels are too low, the water is under-saturated, and the water will become aggressive as it attempts to obtain the calcium it needs. Such "soft-water" will actually corrode surfaces inside the pool which contain calcium and other minerals to maintain its hardness demand. If your Calcium Hardness levels are too high you can use trisodium phosphate to lower the levels. This can also be accomplished by dilution (draining old water and adding water to the pool that has lower calcium hardness content). Levels which are too low, require the addition of calcium chloride.