



SCALE BUILD-UP



HIGH PH INDICATION

- Poor sanitation of water
- Cloudy water
- Shorter filter runs
- Calcium scale formation
- Skin and Eye Irritation

LOW PH INDICATION

- Poor sanitizer efficiency
- Etched or stained walls
- Corroded metals/equipment
- Skin and eye irritation
- Destruction of total alkalinity

pH, Alkalinity and Water Hardness

A swimming pool is considered balanced if it contains the the correct level of alkalinity, pH and calcium hardness.

The white, chalky, rough feeling on the walls or floor of your pool is a build-up called scale. The longer the scale is on the walls or floor, the harder it is to remove.

Scaling is the result of high pH level in the water. The water becomes saturated with calcium carbonate

But let’s talk about the basics. pH refers to potential hydrogen and it measures the hydrogen ions in the water. More hydrogen ions lead to a lower pH value (more acidic). Fewer hydrogen ions lead to a high pH value (more basic or alkaline).

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The pH of the water has a direct effect on the efficiency of the chlorine as well as the corrosive properties of the water.

Free chlorine (chlorinated water that has not yet interacted with contaminants) is most effective at 7.2-7.4.

Combined chlorine

(basically free chlorine that has already bound itself to the pool contaminants) is useful but not in high amounts, High combined chlorine is what causes the chlorine smell.

Water that is too acidic (lower numbers 6.9 or basic higher numbers 7.6) can cause swimmer discomfort, cloudy the water and cause damage to the pool or pool equipment.

Properly balanced water or saturated water prevents damage to the pool and equipment.

Unsaturated water corrodes the fiberglass walls, fixtures, and plumbing, and causes metal staining.

Oversaturated water deposits scales (calcium) or becomes cloudy.



HIGH TOTAL ALKALINITY

- Hard to change pH
- Scale formation
- Cloudy water
- Skin and eye irritation
- Poor sanitizer efficiency

LOW TOTAL ALKALINITY

- Rapid changes to pH or "pH bounce"
- Stained, etched or break down of gel coat
- Corroded metals equipment
- Skin and Eye Irritation



While pH measures the concentration of hydrogen ions or acidity of the water, alkalinity is a measure of pH buffering capacity. Alkalinity is the ability of the water to neutralize the changes in the water.

Alkalinity keeps the pH within the proper levels so that the chlorine can work effectively. The level should be between 80-140 - 80-120 ppm for pools.

The amount of alkali (hardness) in the water determines how easy it is for changes to pH to occur.

If the alkalinity is too low (below 80 ppm), there is insufficient "buffer" to the pH. High alkalinity (above 220 ppm) will result in the water being too "buffered" making it difficult to adjust or correct the pH.

Total alkalinity and pH are related to water balance because at low pH (acidic) conditions, all the carbonate ions are converted to bicarbonates. There is no calcium carbonate formed and the water becomes aggressive to the pool walls and equipment. At high pH (basic) conditions, too much carbonate is formed and even the smallest amount of calcium ion present precipitates causing cloudy water or scale to form. At normal pH conditions, (7.2-7.4) most of the carbon ion are in the bicarbonate to provide buffering.

WATER HARDNESS

Water hardness is a concentration of the calcium and magnesium in the water. This is dependent on your water source.

Calcium hardness is the amount of dissolved calcium (plus other minerals, magnesium) in the water. If you see calcium scaling up the pipework or the surface of the pool, IT IS NO LONGER DISSOLVED and therefore, you have too much calcium.



Too little could lead to the water satisfying its appetite for calcium by taking it from your grouting.

Like pH and alkalinity, calcium hardness affects the tendency of the the water to be corrosive or scale forming. The calcium carbonate will precipitate and adhere to the pool walls.

The acceptable max calcium hardness depends on the amount of total alkalinity needed for pH buffering. If a pool tends to change pH rapidly, high quality alkalinity (over 100 ppm) is needed. Calcium hardness should not exceed 400-600 ppm, depending o the pH and water temperature.

Products that can help remove, solve and prevent scale:

- Natural Chemistry Pool Perfect, 4 Liter - dolheny.com
- Pure Enzyme for Pools, a monthly treatment can be found at Waters Choice
- Pure Ascorbic Acid sold on Amazon can help remove scale (about \$20 per bag)