



# Pool Chemistry

FOR ELECTRONIC CHLORINE GENERATORS



**It is important to maintain salt and stabilizer levels in order to prevent scaling and to ensure maximum enjoyment of the pool. Test the water periodically and use standard pool industry procedures to adjust levels.**

## Salt 2700 to 3400 ppm

Check monthly (using the digital salt display). The higher end of the salt level range lets the electronic chlorine generator produce more chlorine and also helps extend the life of the cell. The electronic chlorine generator will indicate when the salt drops below 2700 ppm and the electronic chlorine generator will stop operating if the salt drops below 2500ppm. On most pools, the salt level tends to slowly drift downward as fresh water is added to the pool (rain or makeup water for splash-out, back-washing etc.). A good procedure is to add enough salt to be near the top of the range. Usually add stabilizer (see below) at the same time.

## Stabilizer 60 to 80 ppm

Check monthly. Stabilizer is also known as conditioner, cyanuric acid, or isocyanuric acid. Refer to local codes regarding its use. Stabilizer helps maintain the chlorine residual in the pool by protecting it from the UV rays from the sun. Without stabilizer, the electronic chlorine generator would have to produce much more chlorine in order to keep the desired residual level in the pool. Add enough stabilizer to be near the top end of the range at the same time you add salt.

## Chlorine

Ideally, all of the chlorine in the pool should be "free chlorine" and there should be zero "combined chlorine." "Free chlorine" means that it is not attached to any contaminants in the pool and is ready to attack any algae or bacteria that it comes in contact with. Note that test kits using the OTO method (yellow color) only test total chlorine and can not differentiate between "free" and "combined". DPD test kits (red color) do allow for the testing of both total chlorine and "free chlorine".

## pH determines Chlorine effectiveness

The recommended pH range is 7.2 to 7.8. If the pool's pH rises above the top end of the range, the sanitizing effectiveness of the chlorine can be greatly reduced. For example: The chlorine in a pool with the pH at 7.2 is approximately ten times more effective than the same amount of chlorine in a pool with the pH at 8.2.

## Why is water chemistry important?

Continuous filtration, cleaning and sanitization are not enough — balancing pH (potential hydrogen) is vital. Chlorination should keep germs and algae at bay but when pH is unbalanced, it can't do its job. Let the pH drop too low and the water becomes acidic and attacks anything it touches. When pH drifts up, the water becomes alkaline and creates an environment where mineral deposits (scale) can form. Furthermore, when pH is high, chlorine becomes less effective at its primary task — killing bacteria and algae.

ORP (oxidation reduction potential) measures the oxidizing capacity in water. It is a proven measurement and maintenance technology mandated for commercial pool sanitization. Unlike most home-test processes, ORP is not fooled by the effects of pH, TDS (total dissolved solids) and other factors. Most home-test kits and strips only report free chlorine and other less effective forms of chlorine. Only ORP can deliver further detailed analysis of the more important free chlorine. It differentiates free chlorine's components HOCl (hypochlorous acid) and OCl- (hypochlorite ion). OCl- is a slow-acting sanitizer, and HOCl is up to 300 times more effective. ORP targets HOCl, a more fine-tuned measurement of the effectiveness of chlorine and water quality.

Studies have reported on the relationship between ORP and chlorine's activity with germs and bacteria. They've concluded that ORP significantly predicts water bacterial quality better than other methods. As a result, in most states, the highly regulated commercial pool industry requires ORP testing.

## What is balanced water?

Water balance is composed of several key factors — pH, total alkalinity, calcium hardness and TDS. All of these factors are important, but none more so than pH. pH is a measurement of the concentration of hydrogen ions in water. It is measured using a logarithmic scale from 0 to 14, with pH 7 being neutral.

For pool water to be in balance, all factors must be in their proper range. That range may vary slightly depending on the finish of the pool and the average temperature of the pool water. The one value that never changes is pH. It must be maintained between 7.2 and 7.8 for a pool to be considered "balanced."

WATER QUALITY PARAMETER	IDEAL LEVELS
<b>Salt</b>	<b>2700 to 3400 ppm</b>
Free Chlorine	1.0 to 3.0 ppm
pH	7.2 to 7.8
<b>Cyanuric Acid (Stabilizer)</b>	<b>60 to 80 ppm (80 ppm best)</b>
Total Alkalinity	80 to 120 ppm
Calcium Hardness	200 to 400 ppm
Metals	0 ppm
Saturation Index	-2 to 2 (0 basil)

