



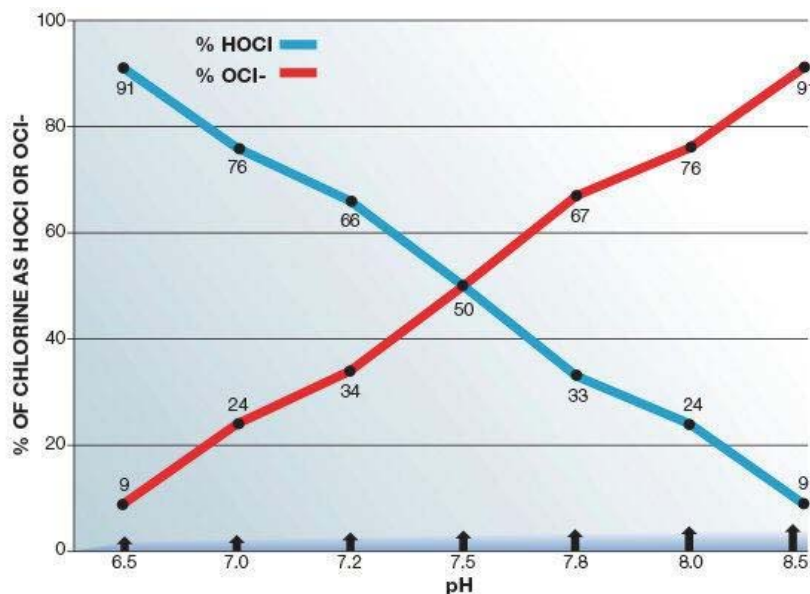
## INFO SHEET

*Performance Through  
Technology and Service*

# The Rise in pH in Saltwater Pools and the Effects on Chlorination.

### Introduction:

California Polytechnic State University's National Pool Industry Research Centre conducted a study examining the rise of pH levels in swimming pools that are sanitised with salt. Researchers tested pH levels every Monday, Wednesday and Friday over the course of several weeks. pH was adjusted to 7.4 after every Friday reading. Over the weekend, pH spiked from 7.4 to 8.0.



The pH in a pool or spa impacts the sanitiser efficacy of chlorine tremendously. For example, at a pH of 7.2, chlorine is 65 percent effective; at 7.8, 32 percent effective; and at 8.0, 20 percent.

As you can see, **chlorine effectiveness decreases dramatically as the pH in water increases.** (The HOCl **blue** line)

This study tells us two things: The first is that salt generators will cause the pH in a swimming pool to rise quickly. The second is that once-a-week testing and adjustment is not enough to maintain proper pH levels.

How many of your customers and homeowners with saltwater pools are hand-dosing multiple times a week? If the answer is most, then they're savvier than the average customer who bought into this technology under the assumption of a maintenance-free pool.

And you and I know that just isn't the truth.

## Want an Interesting Solution?

**Maintaining proper pH balance is tricky. What's the solution? Here's a hint: You're breathing it.**

So, how can they keep their pools free and clear of scaling, calcium build-up and other problems that arise when pH and alkalinity are off the charts?

The answer is literally in the air.

Carbon dioxide (CO<sub>2</sub>) has a significant role to play in the carbonate system. As you know, pH is the measure of hydrogen ions in the water. Total alkalinity is the measure of three different ions: hydroxide, bicarbonate and carbonate. When pH falls below recommended levels, CO<sub>2</sub> asserts itself and rapidly becomes a major player in the water's carbonate content. Essentially, when pH drops, a portion of the compounds that had been bicarbonate and carbonate now become CO<sub>2</sub> and carbonic acid. Conversely, when pH is above 8.2 — poof! It's gone. No more CO<sub>2</sub>.

If only there were some way — some machine, perhaps — to feed doses of CO<sub>2</sub> into a pool on a routine basis. Turns out, there is. Carbon dioxide can be added to the pool via automation to buffer the water against sudden changes in pH.

It's the only viable alternative to hand-dosing.

Automated systems are more commonly associated with commercial pools, but they're finding their way into the residential market. There are many companies that sell CO<sub>2</sub> systems. Some systems use a timer box that is programmed to release CO<sub>2</sub> at a scheduled time daily. Other systems use a probe that measures pH and dispenses CO<sub>2</sub> as needed. Most will use a 20-pound tank that will need to be replaced once or twice each summer on an average-sized inground pool.

The carbon dioxide method has the following advantages over acid:

CO<sub>2</sub> will only lower pH and has no effect on total alkalinity, whereas muriatic acid will lower both.

CO<sub>2</sub> lowers pH gradually for more precise control.

CO2 is an odourless, colourless gas that is sold in tanks that are incombustible under normal conditions. It is safe to handle and is a natural product (simply extracted from the air). Hydrochloric acid must be handled with care as the liquid can burn you and the fumes can harm your lungs in large doses.

And since a CO2 injection system can maintain pH level from 7.2 to 7.4, you will use less sanitizer due to the increased efficiency of chlorine.

A caveat: Carbon dioxide isn't suitable where source water is high in alkalinity or calcium hardness, and pools with water features can diminish its effectiveness.

All the CO2 systems mentioned are an easy install for any service professional, allowing you to maintain proper pH levels between service visits.

### **Why maintaining pH levels is so crucial**

**Comfort:** Nothing impacts a swimmer's comfort more than pH. When pH is too low (under 7.0), or too high (above 7.8), a bather will experience eye and nose irritation, itchiness of the skin, and a possible rash.

**Health:** According to the Centres for Disease Control and Prevention, the best way to prevent recreational water illnesses, including gastrointestinal, skin, ear, respiratory, eye, neurologic and wound infections, is to maintain a pH of 7.2- to 7.8 and a sanitizer level of 1.0- to 3.0 parts per million. When proper pH and sanitizer levels are maintained, most RWIs (Recreational Water Illnesses) will be killed within one hour.

**Equipment:** Maintaining proper pH levels is essential to extending the life of your pool equipment. When high pH is present, scaling and calcium buildup can occur on equipment, causing clogging of the filter. Water can become cloudy or dull as well. When pH is too low, metal corrosion occurs, staining or etching from the corrosion happens, and pool plaster and grout can dissolve.

### **ABOUT THE AUTHOR**

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Robert Flynn is a Certified Pool Operator and co-owner of Proven Water Solutions. He is a 14-year industry veteran with experience in service, installation, and automated systems.