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Helpful Information for You and Your Pool

Why Maintaining pH Levels in Saltwater Pools is so Crucial

Introduction

Maintaining a balanced pH in your pool is essential for effective chlorine function and cost efficiency. An imbalanced pH, although not initially costly, can lead to significant expenses and damage over time.

If your pool water is too acidic, the first sign of trouble will be the dissolution of grout, followed by the degradation of tiles, and eventually, the erosion of concrete.

On the other hand, if the water is too alkaline, it may not be as immediately harmful, but it will cause unsightly scale formation. This scale buildup occurs both inside the pool and within the pipework, leading to increased maintenance costs and potential damage over time.

Additionally, swimming in improperly balanced water can be unpleasant and harmful. A pH level far from neutral (around 7) can cause brittle hair, itchy skin, and bleached bathing suits for you and your family.

Balancing the pH level of your pool takes just two minutes and costs very little, using either acid or soda. Considering the significant investment a pool represents, it's wise to take these simple steps to prevent costly damage and ensure a pleasant swimming experience.

Here is how a leading water quality management company details the issues. (well worth reading this easy-to-follow article)

How to Maintain pH in Saltwater Swimming Pools

Posted by [Dominic O'Donnell](#) from Sensorex, USA. October 10, 2022

If you've outfitted your home with a saltwater swimming pool, you might believe that the maintenance for this type of pool will take up more of your time compared to a chlorine pool. While you'll want to take steps to maintain your saltwater pool and make sure that the water has a healthy pH level, the upkeep for a saltwater pool is relatively straightforward and shouldn't be too much of a hassle as long as you know what to do.

In most cases, the pH of a saltwater pool should be maintained at a level of 7.2-7.8. If pH levels drop too far, the water itself could have a poor quality. When pH levels rise too high, the equipment in your pool could start to degrade, which is why **it's essential that you correctly monitor and maintain pH levels.**

One notable benefit of having a saltwater pool is that you don't need to add a substantial amount of chemicals to reduce or increase the water's pH levels. With the right approach, you should be able to maintain your pool's pH levels without too much work. In this guide, you'll learn all there is to know about maintaining pH levels in a saltwater pool.



What is The Difference Between Maintaining a Saltwater Pools vs. Chlorinated Pools

There are two primary types of pools that you can obtain for your home, which include saltwater pools and chlorinated pools. The end result of both pool types is clean and chlorinated water. In chlorine pools, the chlorine chemical is added directly to the water at highly concentrated levels. For saltwater pools, the electrolysis process naturally converts salt into chlorine.

Maintaining pH in Saltwater Pools

Maintaining pH levels in saltwater pools isn't that difficult as long as you take the right approach. Saltwater pools use chlorine just like chlorinated pools. Owners of chlorinated pools are tasked with adding chlorine tabs to their pools every few days. In comparison, **saltwater pools pass water directly through a salt-chlorine generator**. As touched upon previously, this generator uses electrolysis along with salt to create hydrochloric acid as well as sodium hypochlorite.

The chlorine is created when electricity is sent through a salt and water solution, which results in your pool receiving the right amount of chlorine. If pH levels need to be reduced, it's possible to do so by adding hydrochloric acid to the water. Increasing pH levels is possible with the **addition of borax and soda ash, both of which increase alkalinity and pH**.

Maintaining pH in Chlorinated Pools

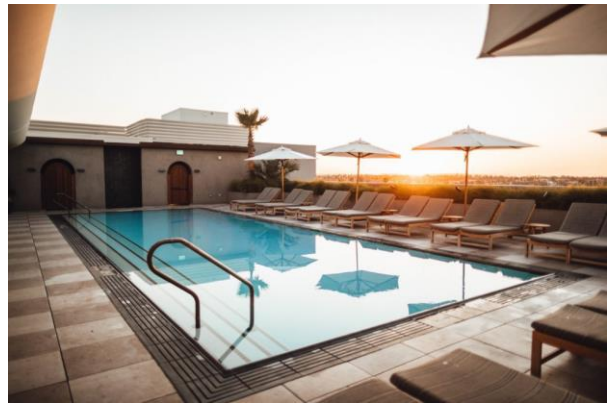


When you want to maintain pH levels in chlorinated pools, regular chemical adjustments must be made. If pH levels are too high, the water may cause a certain amount of skin irritation while also corroding any metal that's present in the pool.

If pH levels drop too low, chlorine could become ineffective, which may lead to the development of algae and bacteria in the pool. If chlorine levels are too low, it's possible to increase chlorine concentration by simply adding chlorine to the pool.

What Causes High pH Levels in a Saltwater Pool?

Even though both chlorine and saltwater pools use chlorine to clean and sanitise the pool water, saltwater pools obtain their chlorine in a manner that causes pH levels to rise consistently. This problem isn't an issue with chlorine pools. The reason why saltwater pools usually have elevated pH levels is because the generation of chlorine with the electrolysis process tends to create byproducts that have a very high pH.



Since chlorine is added directly to chlorinated pools, pH levels are easier to manage. When the electrolysis process occurs in a saltwater pool, the sodium hydroxide byproduct is created. This particular byproduct has a pH that's oftentimes above 13.0, which is why pH levels in saltwater pools consistently increase.

Another potential yet less likely cause of rising pH levels is because the alkalinity in your pool is too high. While alkalinity is meant to exist as a buffer to ensure that pH levels are stable, **alkalinity levels that are too high can cause pH to increase as well.**

Effects of Having High pH Levels in Saltwater Pools

In the event that the water in your saltwater pool has high pH levels, there are numerous issues that can arise to the detriment of your pool equipment and the health of anyone who swims in the pool. The adverse effects of high pH levels in saltwater pools include:

- Eye discomfort and irritations
- Skin irritations
- Murky water
- Scale buildup on pool tiles and pool equipment
- Chlorine becoming ineffective
- Reduced efficiency of saltwater generator

High pH levels are irritating to anyone who swims in the water. If scale forms at different areas inside your pool, you'll be tasked with cleaning these areas, which only serves to take up too much of your time. If pH levels increase by a large amount, the efficacy of chlorine will worsen, which means that you'll be tasked with adding more chlorine to the water to provide the same effects.

Why Maintaining pH Levels in Saltwater Pools is so Crucial

Maintaining pH levels is essential for your comfort, health, and condition of equipment.

Comfort

If pH in your pool water is lower than 7.0, you can experience itchiness around your skin as well as a rash. When pH levels increase above 7.8, **you'll likely experience nose and eye irritation.**



Health

As for your health, the easiest way to avoid water illnesses is to make sure that you maintain pH levels that range from 7.2-7.8. The sanitizer level should also be around 1.0-3.0 parts per million. If these levels are correctly maintained, the majority of recreational water illnesses should be killed in one hour or less.

Equipment

Maintaining the right pH levels is also important if you want to make sure that your pool equipment remains in good condition. If pH levels are too high, **calcium and scale building may develop on the pool equipment**, which could clog your filter. If pH levels are too low, the metal can become corroded. It's also possible for the grout and plaster in your pool to dissolve, which is why it's essential that pH levels are maintained. Keep in mind that you can use a standard pH sensor to make sure that pH levels are optimal.

What PH Is Considered Too High?

As touched upon previously, pH levels that are situated between 7.2-7.8 are optimal. Any measurement that's above 7.8 would be considered too high. Side effects invariably worsen as the pH levels increase.



Best Chemicals to Reduce Saltwater Pool pH

There are two separate chemicals that can be added to a saltwater pool when you need to reduce the water's pH. **These chemicals include Hydrochloric acid and sodium bisulphate.**

Hydrochloric Acid

Hydrochloric acid is an exceedingly common acid that's available in liquid form and can quickly reduce the water's pH. It's also more affordable than sodium bisulphate. Keep in mind that this chemical shouldn't be used with vinyl liner pools.

Sodium Bisulphate

Sodium bisulphate is available in powder form and can be purchased from pool stores. This chemical is oftentimes seen as "pH reducer" or "alkalinity reducer" in stores. You'll find this chemical in a container or bucket. More sodium bisulphate is needed to reduce water's pH when compared to Hydrochloric acid, which is why it's more expensive. Keep in mind, however, that this substance is safer to handle.

How To Lower PH In a Saltwater Pool

The pH of a saltwater pool can be reduced with a five-step process, which begins by testing your water.

1. Start by Testing Your Water

The first step involves testing your water, which is the only way to determine what your starting pH and total alkalinity are at. You can obtain this measurement with a pH sensor.



2. Figure Out Your Pool Capacity

If you want to make sure that the right amount of acid is placed into the pool, it's essential that you measure your pool volume or capacity. This measurement should be obtained in gallons. If you're unsure of what the pool volume is, you'll be tasked with measuring the pool depth, width, and length in feet. A [pool volume calculator](#) will then provide you with the capacity.

3. Calculate the Amount of Acid You Need

The third step in this process involves calculating the total amount of sodium bisulphate or Hydrochloric acid to place in the water. Keep in mind that **sodium bisulphate can damage the surfaces and coatings in your pool**, which is why you might want to opt for Hydrochloric acid. In most cases, 300 ml. of Hydrochloric acid at 15% strength will lower the pH of a 45,000 Litre pool by 0.1. If the Hydrochloric acid is at 31% strength, you'll need 150 ml of the chemical to reduce pH by 0.1.

4. Pour the Acid into Your Pool

It's now time to pour the acid directly into your pool. **Make sure that you wear protective equipment while doing so**, which includes goggles and gloves. The process of adding Hydrochloric acid to a pool is to:

- Place yourself nearby a return jet at the deeper portion of your pool
- With a measuring cup in one hand and the Hydrochloric acid in the other, move your arms outwards as far as they can go over the pool water
- Pour the acid into the cup before pouring it into the water
- Repeat this process until enough of the acid has been placed in the water

5. Perform a Final Water Test

The fifth step is to perform a final water test, which should only take you a few minutes with the right pH sensor. After you place the Hydrochloric acid into your pool water, wait for 15-20 minutes before performing this test. **The pH readings should be between 7.2-7.8.**

Now that you understand what it takes to maintain pH in saltwater swimming pools, you shouldn't find it too difficult to keep your pool water clean and healthy. Make sure that you [always have a pH sensor on hand](#) to consistently monitor pH levels.

Raising pH in a Saltwater Pool: Methods and Steps

Maintaining the proper pH level in a saltwater pool is essential for ensuring water quality, swimmer comfort, and the effectiveness of pool chemicals. If you find that the pH level in your saltwater pool is too low and needs adjustment, there are effective methods you can employ

to bring it within the recommended range. Here, we'll discuss how to raise the pH in your saltwater pool using different approaches.

Method 1: Using Chemical pH Increasers



Step 1: Test Your Water

Before making any adjustments, start by testing the current pH level and total alkalinity of your pool water using either test strips or a liquid test kit. This baseline measurement is crucial for determining the appropriate amount of pH increaser to add.

Step 2: Choose the Right pH Increaser

There are common household products that can be used to increase pH levels in your saltwater pool, such as soda ash and borax. Both of these options can effectively raise pH, but they differ in their impact on total alkalinity.

- **Soda Ash:** This substance increases both pH and alkalinity. Choose soda ash if your alkalinity is also low and needs a boost.
- **Borax:** Borax raises pH while only slightly affecting alkalinity. Opt for borax if your alkalinity is already within the desired range and doesn't require significant adjustment.

Step 3: Calculate the Dosage

To determine the right amount of pH increaser to add to your pool, you'll need to know your pool's volume in gallons. Using a pool chemistry calculator, input your current pH and alkalinity levels along with the pool's volume. The calculator will provide you with the specific amount of soda ash or borax needed to reach your target pH level.

Step 4: Add the Increaser to Your Pool

Carefully measure out the calculated amount of soda ash or borax based on the calculator's recommendation. Broadcast the powder evenly in the deep end of the pool, preferably near a return jet to aid in circulation. Allow the pump to run for about an hour to ensure proper distribution and dissolution of the pH increaser.

Step 5: Retest and Monitor

After giving the pH increaser some time to take effect, retest your pool's pH level. If necessary, make additional adjustments by repeating the process. Keep in mind that it's a good idea to start with a slightly lower dosage than calculated and then retest before adding more if needed.

Method 2: Using Aeration



Step 1: Understand Aeration

Aeration is a natural process that involves exposing water to oxygen from the air. This causes the water to release carbon dioxide, which in turn raises the pH level. While all pools are exposed to oxygen at the surface, you can increase aeration intentionally to expedite pH adjustment.

Step 2: Promote Aeration

There are several ways to promote aeration in your saltwater pool:

- **Keep the Pump Running:** Allowing the pump to run continuously can increase water movement and surface exposure to air.
- **Use Water Features:** Turning on water features like fountains, waterfalls, or jets creates movement and increases aeration.
- **Adjust Return Jets:** Angle your return jets to direct water towards the surface, creating more agitation and aeration.

Step 3: Be Patient

Using aeration to raise pH is a slower process compared to chemical adjustments. It might take a day or two to notice significant changes in pH. However, this method has the advantage of not significantly impacting alkalinity.

Posted by [Dominic O'Donnell](#) on October 10, 2022 Sensorex is a global leader in the design and manufacture of quality sensors for water quality and process applications. The company offers more than 2000 sensor packages for pH, ORP, conductivity, dissolved oxygen, free chlorine, chlorine dioxide, UV transmittance and other specialty measurements, as well as a full line of sensor accessories and transmitters. Its expert technical support engineers solve analytical sensor challenges with custom designs and off the shelf products.

Another article which looks at some added reasons why pH in (Saltwater) Chlorinated Pools is important to know and understand, for maximum pool enjoyment.



- 25 Oct 2023

The causes of high pH in a pool include the introduction of alkaline solutions, loss of carbon dioxide, high alkalinity, temperature changes, and environmental factors such as debris and other contaminants.

Maintaining proper water chemistry is crucial for the health and safety of your pool. One important factor to consider is the pH level. pH measures the acidity or alkalinity of the water on a scale of 0 to 14, with 7 being neutral.

When the pH of a pool rises above the recommended range, it is considered to have a high pH.

What Is pH & Why Is It Important In Swimming Pools?

Before we dive into the causes of high pH, let's first understand what pH is and why it is important for pool water. pH stands for "power of hydrogen" and represents the concentration of hydrogen ions in the water. It is a logarithmic scale, meaning that each whole number change represents a tenfold difference in acidity or alkalinity.



The Centers for Disease Control and Prevention (CDC) recommends swimming pools to have a pH of 7.2–7.8, with 7.4 to 7.6 being the optimal range. They also advise that swimming pools have a free chlorine concentration of at least 1 ppm.

What Causes A High pH In Swimming Pools?

Understanding the factors that cause high pH in a swimming pool is essential for effectively addressing the issue and preventing it from being a regular occurrence.

Introduction of Alkaline Substances

Alkaline substances are those that have a pH value greater than 7. When these substances are added to a swimming pool, they can cause the pH level to rise above the ideal range.

Several common alkaline substances can cause the pH level to rise in a swimming pool such as baking soda, which is often used to increase the alkalinity of pool water. While adding baking soda can help to stabilize the pH level, it should be done in moderation as adding too much baking soda can lead to an excessive rise in pH, which can be difficult to correct.



Another alkaline substance that can contribute to a high pH level is calcium carbonate. This compound is often found in tap water and can be introduced into the pool through regular water top-ups. Over time, calcium carbonate can accumulate in the pool and cause the pH level to rise. It is important to regularly test the pH level of your pool water and take steps to correct any imbalances.

To prevent a high pH level in your swimming pool, it is important to regularly test the water and make adjustments as needed. This may involve adding chemicals such as Hydrochloric acid or a pH decreaser to [lower the pH level back into the ideal range](#). It is also important to monitor the alkalinity and calcium hardness levels of your pool water, as these can also impact the pH balance.

Carbon Dioxide Loss

When carbon dioxide (CO₂) is lost from a swimming pool, it disrupts the delicate balance of chemicals in the water. Carbon dioxide is naturally present in the air and can dissolve in water. In fact, it is one of the main factors that help to keep the pH level of a pool balanced. When CO₂ is lost through aeration, splashing, or agitation, the pH tends to rise, resulting in a high pH.

One solution is to monitor and maintain the CO₂ levels in the pool. This can be done by regularly testing the water with a [CO₂ meter](#) and adjusting the chemicals accordingly. Adding a CO₂ source, such as sodium bisulphate or Hydrochloric acid, can help to lower the pH and bring it back into balance. It's also important to ensure that the pool is properly ventilated to prevent excessive CO₂ loss.

Another solution is to consider using alternative sanitising methods that are less affected by pH levels. For example, saltwater pools use a process called electrolysis to produce chlorine

from salt, which is not as sensitive to pH fluctuations and therefore maintains and stabilizes the pH level better.

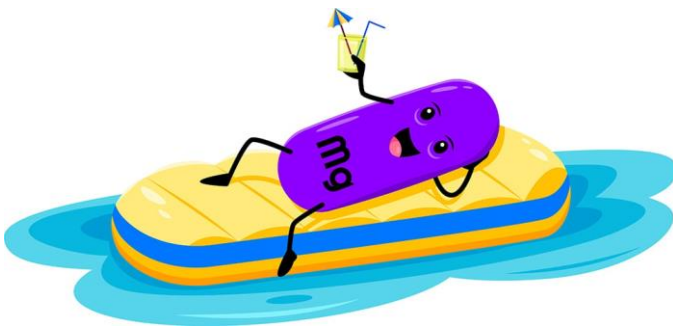
High Alkalinity

When the alkalinity levels are high, it means that there is an excessive amount of bicarbonate ions in the water. These bicarbonate ions act as a buffer against changes in pH and can push the pH level above the desired range, resulting in a high pH in the swimming pool.

To address high alkalinity and subsequently high pH in a swimming pool, it is essential to test the water regularly. If the alkalinity level is too high, it can be adjusted by adding an acid such as Hydrochloric acid or sodium bisulphate to lower the alkalinity and bring the pH back into the desired range.

Environmental Factors

One of the primary reasons for a high pH is the presence of mineral-rich water sources. When the pool is filled with water that contains high levels of minerals such as calcium and magnesium, the pH level tends to rise. These minerals are known as “hard water,” and they can cause an increase in alkalinity, resulting in a high pH. This is especially common in areas where the local water supply is naturally high in minerals.



Another environmental factor that can contribute to a high pH in a swimming pool is the surrounding vegetation such as trees and plants that release organic compounds into the air, which can find their way into the pool water through rainfall or wind. These organic compounds, such as leaves, pollen, and other

debris, can react with the pool water and cause a rise in pH levels. Additionally, if there are excessive amounts of dust or dirt in the surrounding area, it can introduce contaminants into the pool water and contribute to a higher pH.

Pool Water (Internal) Temperature Changes

One of the main reasons [why temperature changes affect the pH](#) of a swimming pool is because of the **relationship between temperature and the rate of chemical reactions**. As the temperature increases, the rate of chemical reactions also speeds up, therefore any chemicals added to the pool, such as chlorine or pH adjusters, will react more quickly and

potentially be used up faster. When the temperature rises, bacteria and other contaminants in the pool also multiply at a faster rate.

To combat this, you may need to add more chlorine to maintain proper sanitation. However, higher temperatures cause chlorine to dissipate more rapidly, leading to decreased effectiveness and bacteria to thrive in the pool water.



Another way temperature changes can influence pH levels is through **evaporation**. Warmer temperatures lead to increased evaporation rates, which in turn can cause the concentration of minerals and other substances in the pool water to rise. This increased concentration can result in scaling on pool surfaces and equipment, as well as an increase in alkalinity.

Whether you have an inside or outside swimming pool, a preventative method to decrease evaporation rates is to use a pool cover when the pool is not in use. Pool covers not only reduce evaporation rates, but they also help to maintain chemical balance in pools.

External Temperature Changes

Another factor to consider is during periods of hot weather. During hot weather, people tend to spend more time in the water to cool off. This increased usage leads to more contaminants being introduced into the pool, such as sweat, sunscreen, body oils, and possibly, urine. These substances can alter the chemical balance of the water, leading to a high pH in a swimming pool.

To prevent temperature-related pH issues in a swimming pool, we recommend regularly [testing the temperature with a temperature sensor](#) alongside testing the alkalinity levels.

Problems With High pH In A Swimming Pool

When the pH of pool water is too high, the **effectiveness of chlorine and other sanitising chemicals is compromised**. This can lead to inadequate disinfection, allowing harmful bacteria and algae to thrive. Consequently, swimmers may be at a higher risk of waterborne illnesses and infections.



High pH can also contribute to the **formation of cloudy water** in pools. This is often due to the precipitation of calcium carbonate, a result of the interaction between high pH and calcium hardness. Cloudy water not only affects the aesthetic appeal of the pool but also indicates an imbalance in water chemistry.

Another issue is **scaling and corrosion**. High pH levels can lead to the formation of scale deposits on pool surfaces and equipment. Scaling occurs when minerals in the water, such as calcium and magnesium, precipitate out of the solution and adhere to surfaces. Over time, these deposits can cause damage to the pool walls, plumbing, and equipment.

Additionally, high pH can corrode metal components, leading to further deterioration.

Have you ever jumped into a swimming pool and immediately felt the sting of chlorine in your eyes? Or maybe you've noticed that the water feels a bit too harsh against your skin. That is because **high pH in a swimming pool can cause skin and eye irritations**. Swimmers may experience dryness, itching, and redness of the skin, as well as eye discomfort and irritation when pH levels spike in the water.

These symptoms can significantly impact the overall swimming experience and may discourage pool usage, it can also cause major issues if your swimming pool is for public use.

Remedies & Solution For High pH In Pools

If you have identified that your pool has a high pH level, you will need to decrease it to the optimal pH level. This can be done in several ways:

- **pH decreaseers**
- **Carbon dioxide off-gassing**
- **Regular water testing and maintenance**
- **Balancing alkalinity**
- **Environmental management**

pH Decreasers

pH decreaseers, such as Hydrochloric acid or sodium bisulphate, are commonly used to lower the pH of pool water. When adding Hydrochloric acid you must add it safely as it is a very strong acid.



Hydrochloric acid and sodium bisulphate work by neutralizing excess alkalinity and reducing the pH level. It is important that when adding pH decreaseers not to go overboard and cause it to become too acidic, otherwise you will need to raise the pH in the pool again.

It is crucial to follow the manufacturer's instructions and use the appropriate amount of pH decreaseer based on the pool size and current pH level.

Carbon Dioxide Off-Gassing

A simple and natural way to lower the pH without adding chemicals is through carbon dioxide off-gassing, such as increasing aeration and water circulation in the pool.

By promoting the release of carbon dioxide, the pH will gradually decrease. This method is particularly effective for small pH adjustments.

Regular Water Testing and Maintenance

Regularly testing the pH and other water parameters is key to maintaining proper water chemistry in your pool. Use a reliable water pH test kit to monitor the pH levels and make necessary adjustments as required.

Additionally, ensure proper filtration, circulation, and sanitation to prevent the accumulation of contaminants that can affect pH balance.

Balancing Alkalinity

Maintaining proper alkalinity levels is crucial for pH stability. If the alkalinity is too high, it can contribute to a rise in pH.

To balance alkalinity, use alkalinity increasers or reducers as needed, based on the test results. It is important to follow the recommended dosage and gradually adjust the alkalinity to avoid sudden pH fluctuations.

Environmental Management

Take steps to minimize the impact of environmental factors on pool water chemistry. Keep the pool area clean and free from debris to prevent the introduction of contaminants. Consider using pool covers to reduce the effects of rainfall and limit exposure to sunlight, which can contribute to pH fluctuations.

Ways To Measure High pH In A Swimming Pool

For accurate and reliable results, we recommend using a pH meter. A pH meter is a handy tool that provides accurate and precise readings of the pH level in your pool. To use a pH meter, you simply need to dip the electrode into a water sample taken from your pool. The meter will then display the pH level on its digital screen. It's important to follow the manufacturer's instructions for calibrating and using the pH meter to ensure accurate readings and to ensure you know [how to calibrate a pH meter correctly](#) and [how often to calibrate the pH meter](#).

On the other hand, if you prefer a more affordable and accessible option, pH strips are a great alternative. These small strips contain chemicals that change color based on the pH level of the water. To use pH strips, you need to dip the strip into a water sample and wait for it to change color. Then, match the color to the provided chart to determine the pH level.

Regardless of which method you choose, it's advised to regularly test the pH level in your pool and make any necessary adjustments.

Summary

Understanding the causes of high pH and implementing appropriate remedies will help you achieve and maintain the optimal pH range. Regular testing, proper chemical adjustments, and environmental management are key to ensuring a well-balanced pool that provides a safe and enjoyable swimming experience for all!



If you would like to know more about high pH in swimming pools or ways to manage the pH level in your swimming pool, do not hesitate to contact the world-class team at [Atlas Scientific](https://atlas-scientific.com).

And finally, from:

**Missouri Department of Health and Senior Services Section for Environmental Public Health
Balanced Water**

There's more to taking care of a pool and spa than just keeping the water clean. You also have to make sure the water is properly balanced. Water that is not balanced -- that is too acidic or too basic -- can cause bather discomfort, cloudy water and damage to the pool and spa surfaces and equipment. Water follows certain natural laws, just like other things around us. Unsupported objects fall to the ground, and this is called the law of gravity. It is the nature of water to dissolve the things it contacts until it becomes saturated. It is possible for it to dissolve too much and become over saturated, at which point the water loses its excess material by precipitation. This is governed by the laws of chemical equilibrium, more commonly referred to as water balance. Many operators are already familiar with this subject to some degree. A commonly used tool in determining the degree of saturation in pool water is the Langeleir Index. Originally devised for the complicated and variable conditions found in industrial water treatment (boilers, cooling towers, heat exchangers etc.), it has been simplified for use with the swimming pool water. The degree of saturation is determined by the pH, temperature, total alkalinity and calcium hardness found in the pool water.

There is huge amount of material about pool water balance and how to measure, manage and correct it. The above is but a very small amount. Hopefully it's increased your understanding of a what seems a simple but in reality, a complex subject.

