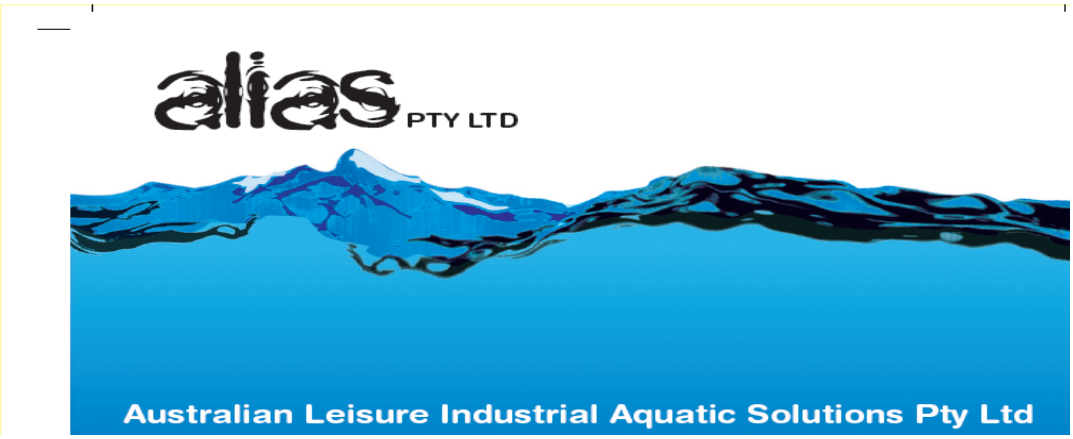


# Chemistry of the Swimming Pool Water

pH or hydrogen ion (H+) concentration is the most important chemical characteristic of pool water. All the important reactions which occur in a pool are in some way affected by the pH of the water. It is most important for operators to be in control of the pool pH at all times.

In simple terms pH is the measure of the concentration of hydrogen ions (H+) in the water.

In pure neutral water a small proportion of H2O molecules dissociate into hydrogen ions (H+) and hydroxyl ions (OH-).

Hydroxyl Ions H2O <---> H+ + OH-

In *neutral* water the proportions of H+ and OH- are equal. pH is 7.

If the proportion of H+ is greater than OH- then the water is acidic and the pH is less than 7.

If there is a greater proportion of OH- than H+ then the water is basic or alkaline and the pH will measure greater than 7.

The pH scale goes from 0 to 14. Each decrease of one unit (e.g. from pH 6 to pH 5) represents an increase in the proportion of H+ of 10 times, i.e. there are 10 times more H+ ions in solution at pH 5 than at pH 6.

The pH scale

0 <---------- 7 ----------> 14

| ACIDS | NEUTRAL | ALKALIS or BASES |
|---|---|---|

A basic rule of thumb is;

***The stronger the acid the lower its pH.***

Correspondingly the higher the pH the more alkaline or caustic the water will be.

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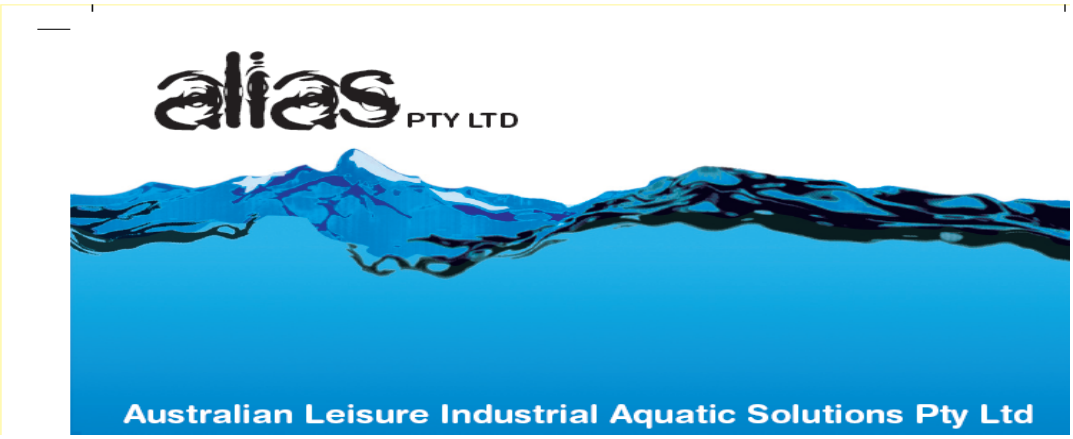


When the pool operator adds an acid such as hydrochloric acid (HCl) to a pool the pH will decrease. This is because the acid liberates an excess of hydrogen ions H+ into the water.

HCl + H2O = H2O + H+ + C1

The addition of sodium hydroxide (caustic soda, NaOH) to water increases the pH.

This occurs because the caustic soda introduces an excess of hydroxyl ions (OH-) to the water.

Other chemicals which increase the pH are soda ash (sodium carbonate, Na2CO3) and sodium bicarbonate (NaHCO3).

NaOH + H2O = H2O + Na + OH-

The ideal pH for a swimming pool is in the range 7.5 to 7.8.



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