# Soda Ash and Bicarb

A series of e-mail articles from the research group onBalance, August 2006

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**Soda Ash - Bicarb Update 1**

For many years there has been a misunderstanding in the swimming pool service industry about the chemical differences between using soda ash (sodium carbonate) versus bicarb (baking soda or sodium bicarbonate) to adjust pH and alkalinity in swimming pool water.

The misinformation being taught in some seminars varies. Some seminar instructors claim that soda ash and bicarb, pound for pound, add equal amounts of alkalinity to pool water while raising the pH differently; while others claim that bicarbonate actually increases the alkalinity more than soda ash! Another inaccurate claim is that sodium bicarbonate will always increase the pH.

SODIUM BICARBONATE

A 1% solution of sodium bicarbonate in water has a pH of 8.4. Therefore, when bicarbonate is added to water having a pH less than 8.4, it will cause the pH to rise towards 8.4. Conversely, and what is not understood by some, is that if the water's pH is greater or higher than 8.4 (which does occur occasionally in swimming pools), adding bicarbonate to this water will decrease or lower the pH down, towards 8.4. This means that in new plaster pools, when the pH often soars to very high levels, adding both acid and bicarbonate will reduce the high pH found in these new pools. By adding bicarb with acid, the alkalinity will be kept at appropriate levels, and balancing after startup will be quicker and easier.

(P.S. If the alkalinity is already high in a new pool, then only acid is needed to lower pH – which also lowers the alkalinity).

**Soda Ash – Bicarb Update 2**

In general, adding sodium bicarbonate will not affect the pH significantly, since the starting pH is not significalntly distant from 8.4 to begin with. However, the further the pH of the water is from 8.4 to begin with, the more effect bicarb will have on shifting the pH. More importantly, the amount and the type of total alkalinity present in the water will also determine the amount of pH change when bicarbonate is added to water. The rule here is that when total alkalinity is low, there is a greater effect on the pH from the addition of sodium bicarbonate (see Wojtowicz Swimming pool and Spa Water Chemical Adjustments Page 39 JSPSI Volume 5 Number 1). For example, if sodium bicarbonate is added to one pool that has a pH of 7.0 and an alkalinity of 20 ppm, and also added to another pool that has a pH of 7.0 but with an alkalinity of 100 ppm, then the greater pH increase will result with the pool that has alkalinity of 20 ppm. This is due to the greater pH buffering of water with higher amounts of alkalinity.

SODA ASH
A 1% solution of soda ash in water has a pH of approximately 11.4. Because of this high pH condition, soda ash will raise the pH in water more significantly than will sodium bicarbonate. And just as with bicarbonate, soda ash will also more significantly increase the pH when a lower alkalinity level exists in the water. (Again, see Wojtowicz JSPSI Volume 5 Number 1.)

Contrary to some information, soda ash also adds more alkalinity than bicarb. The amount of alkalinity contributed by soda ash is about 58.5% more than sodium bicarbonate, or in other words sodium bicarbonate is only about 63% as strong as soda ash in terms of increasing alkalinity.

**Soda Ash – Bicarb Update #3**
So what does all of this mean? Well, first it means that if you only need to raise alkalinity but the pH is okay, it is better to add bicarb because it will contribute the alkalinity needed without affecting the pH very much. If you need to raise the pH but the alkalinity is okay, then adding soda ash is best. But don't assume that the alkalinity won't go up, it will. You just hope the alkalinity won't go up too much. Generally, do not add more than 4 pounds at a time per 20,000 gallons.

And if you need to raise both the pH and alkalinity, then pound for pound you get more "bang for your buck" with soda ash, and it is cheaper too. But be careful. Adding too much soda ash will often cause the precipitation of calcium carbonate which results in cloudy water.

P.S. A detailed explanation of the chemical differences between Sodium Carbonate and Sodium Bicarbonate appeared in the September 15, 2005 issue of Service Industry News.