



CHLORINE LOCK:

If the level of cyanuric acid (stabiliser) in the water is much over 80ppm, the chlorine becomes trapped and is unable to oxidise effectively. Despite being able to measure normal chlorine levels, the Redox potential is very low, indicating a lack of oxidiser. The only way to fix this is to drain some of the water and refill the pool. Care should be taken when using stabilised chlorine products (dichlor or trichlor) to avoid the level of cyanuric acid increasing too much.

Chlorine Stabiliser - Cyanuric Acid

Chlorine can be easily destroyed by sunlight. On a hot sunny day, 2 ppm of chlorine can be lost from a pool in as many hours through decomposition by sunlight. Some years ago, it was found that if the weak organic acid - Cyanuric Acid was introduced to form a compound of chlorine in swimming pool water, the action of sunlight destruction of chlorine was greatly reduced.

Since then, the demand for chlorinated isocyanurates has multiplied, and provides the bulk of the residential chlorine sales. The "Chlorine Granules" or "Dichlor Granules" popularly used for disinfecting residential pools contain cyanuric acid.

The proportion of cyanuric acid in stabilised chlorine granules is fixed chemically, and cannot be altered.

Whilst the available chlorine gets used, will disappear, and will need replacing regularly, - the cyanuric acid residual does not get used up. Its job is solely to reduce the effect of sunlight decomposition on chlorine, and although the chlorine will eventually be lost, - the cyanuric acid remains in the water. Adding stabilised chlorine to the pool water will add the cyanuric acid residual already there. The problems start when there is too much stabiliser (cyanuric acid) in the water, - the chlorine becomes Over-Stabilised.

Normally, if the pool owner looks after their pool correctly, they will be backwashing the filter regularly - so losing water which is subsequently replaced with fresh water. It is this Dilution with fresh water, which keeps the stabiliser at a satisfactory level. But if the pool owner neglects the pool and backwashes infrequently, or for only a very short time, there is not enough dilution to control the stabiliser residual level - and of course, the cyanuric acid level will rise.

The action of cyanuric acid can be illustrated with a Boxer in a Boxing Ring. The boxer representing chlorine. You can easily "test" the presence of the boxer! - And if you entered the ring (pool) he could spoil your day very quickly! - But, - he could very easily jump over the ropes and be gone! (Chlorine decomposition by sunlight)

To reduce the possibility of our boxer jumping out of the ring, we can stretch a net over the top of the ring (stabiliser). If you were to get in the ring, the boxer could still spoil your day, he may just take a little longer doing so because of the net - but he is still very effective! (Our chlorine is stabilised correctly)

But, if we were to add another net to the ring on top of the first, - and another, - and another, - and another, and so on (too much stabiliser), our boxer would be weighed down by all the nets, and his effectiveness would be greatly reduced. You could still accurately "test" that he was there - but he would no longer be an effective boxer!

If the number of nets (stabiliser level) were to continually increase, eventually our boxer would be incapable of moving (Chlorine Lock). We could still determine that he was present in the ring - but our test would not show that he was, in fact, completely restricted by these nets. (We would need to "test" the number of nets to decide if our boxer could cause any harm to anyone)

This is a fairly good explanation of the effect of Cyanuric Acid on chlorine, in pool water. Probably the biggest problem we encounter is that of Chlorine Lock - too much cyanuric acid in the water, because the owner has not carried out sufficient dilution.

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At this point we need to determine the correct level of stabiliser. We have seen a wide range of "Maximum Levels" suggested. Originally, 200 ppm was quoted as a safe limit, since this level is considered the maximum safe level for bathers. We still sometimes see this figure suggested as the "maximum level" allowed.

However, the proven reduction in disinfection takes place at a much lower level. Nowadays, as knowledge of the product increases, it is generally accepted by professional and experienced pool operators and engineers that the ideal level should be about 30 ppm, and a maximum acceptable level should be 50 - 60 ppm. In an outdoor pool, if the stabiliser level is below 25 ppm, chlorine is being wasted unnecessarily.

It has sometimes been suggested (by a stabilised chlorine manufacturer) that chlorinated water with Cyanuric levels greater than 400 ppm will actually experience an increase in disinfection activity, although how much killing power is due the very high and toxic level of Cyanurates themselves is not mentioned, and anyway, since the maximum level determined for health reasons is 200 ppm the subject is of little interest (except perhaps to manufactures and distributors of stabilised chlorine). Another reason that high levels of Cyanurates should not be allowed or encouraged is that Cyanuric Acid attacks copper! Sustained high levels of Cyanuric Acid will frequently reduce the life span of a copper heat exchanger considerably. And, of course, no cyanurates should be present if a Silver/Copper ionic purifier is used in a pool.

The presence of significant levels of Cyanuric Acid can also "interfere" with the Total Alkalinity test and cause the reagent to indicate a higher total alkalinity than is actually in existence. We have found that a "Corrected Total Alkalinity" level can be calculated by subtracting 1/3rd of the Cyanurate level from the Total Alkalinity Level.

i.e. Indicated Total Alkalinity 130 ppm, Cyanuric Acid level 90 ppm, - so, 1/3rd of 90 is 30, - 130 minus 30 = 100. Therefore, Corrected Total Alkalinity is 100 ppm

Stabilised chlorine is not really necessary to be used for an indoor pool, although a low level of cyanuric acid (around 15 ppm) may extend the life of the chlorine residual in a very lightly used pool. Automatic chemical control systems also suffer with the presence of cyanuric acid in the pool water. An increasing number of manufacturers will not consider installing their equipment if stabilised chlorine is present. The presence of cyanuric acid may "poison" the delicate and sensitive junctions in both chlorine and pH sensor probes, causing the automatic dosing equipment to become unreliable and/or inaccurate.

Although the "trichlor" chlorine tablets can be, and often are used for commercial pools, the Stabilised Chlorine granules should never be used commercially, and are essentially designed for the home pool owner to use as the regular disinfectant. Some pool owners make the mistake of using these stabilised chlorine granules for "shock" treatment!

This is incorrect - a **non-stabilised chlorine** (such as calcium hypochlorite or sodium hypochlorite) should always be used for any shock treatment.