

## Don't Forget Water Balance In Private Domestic Swimming Pools & Spas

Mains water out of the tap in the UK is seldom satisfactorily balanced for swimming pool & spa purposes

Just as important as the proper dosing of a sanitizer it's really important **not to ignore** maintaining water balance as well, because failing to do this, as is appropriate for the sanitation system employed, is likely to result in damage being caused to expensive equipment and/or bather health & wellbeing. Just dosing a sanitizer isn't enough to keep the pool free of problems and it's a false economy to think that money is saved by being "re-active" to water problems when they arise. It's much more cost effective to be "pro-active" by making sure that issues don't develop in the first place. Water balance constantly changes in a pool and should be checked weekly as routine. In order to help maintain water balance an internationally accepted measurement scale called the Langelier Saturation Index (LSI) is used which combines water temperature, pH, Total Alkalinity, Calcium Hardness and Total Dissolved Solids in a formula to provide a calculation of water balance - A result of zero is ideal but a result within the range -0.5 to +0.5 is generally regarded as "balanced". Our FREE LSI calculator for smart phone is available in the Android marketplace.

### Calcium Hardness:

For pools using chlorine or bromine as the sanitizer calcium hardness should be maintained in the range 175 – 225 ppm for fibreglass pools & pools with vinyl liners, or 225 – 350 ppm for tiled pools. For pools using PristineBlue™ as the sanitizer of choice the calcium hardness MUST be maintained below 300ppm and ideally in the range 100 – 300 ppm.

Low calcium hardness in tiled pools may result in the water attacking the grout between the tiles and metal fittings. Calcium hardness below 100ppm in any pool may cause the water to feel "slimy" to bathe in.

High calcium hardness results in the formation of scale which will damage the pool surfaces, pipe-work and plant-room equipment. For pools which are sanitized using PristineBlue™ excessively high calcium hardness will also stop the sanitizer from working to its full potential or maybe not at all if calcium hardness is much above 300 ppm.

Calcium hardness can be increased by dosing Calcium Chloride

Calcium hardness can be reduced by dosing a calcium hardness reducer (viz: PristineCheck™ or Sodium Hexametaphosphate).

**Calcium hardness should be checked at least monthly (more often in very hard water areas).**

### pH:

pH should be maintained in the range 7.2 – 7.6 for most sanitizers used.

Low pH may be uncomfortable for bathers (eye & skin irritation) and for pools using chlorine as the sanitizer, may push the sanitizer out of the water into the air thereby reducing sanitizer performance in the pool where it's needed.

High pH (above 7.8) may also be uncomfortable for bathers (also causing eye & skin irritation) and for pools using chlorine as the sanitizer will stop the sanitizer from working. In spas pH normally will rise as a result of water aeration.

pH is increased normally by dosing Sodium Carbonate (Soda Ash)

pH is reduced normally by dosing Sodium Bisulphate (Dry Acid)

**pH should be checked at both ends of the pool at least weekly.**

### Total Alkalinity:

Total Alkalinity should be maintained within the range 80 – 120ppm for chlorine and bromine sanitized pools, and within the range 50 – 90ppm for pools using PristineBlue™ as the sanitizer.

If the TA is too low control of the pH will be lost resulting in pH "bounce".

If the TA is too high it will be difficult to reduce pH and water may cloud.

TA is increased normally by dosing Sodium Bicarbonate

TA is reduced normally by dosing Sodium Bisulphate (Dry Acid)

**TA should be checked at least weekly.**

### **Total Dissolved Solids (TDS):**

Every time that a chemical is dosed to the pool water it will raise the TDS and when the level gets too high (above 1500ppm) all sorts of problems may start happening including the water becoming cloudy, loss of pH control and the sanitizer may stop working. TDS can only be reduced by dilution with fresh water with low TDS.

**TDS levels should be tested monthly.**

## **Other things *important* to check....**

### **Cyanuric Acid:**

Cyanuric acid is dosed in order to stabilize chlorine in the water from the destructive effects of UV (sun) light in outdoor pools. Trace amounts of cyanuric acid are included in most sodium based chlorine donor formulations. The cyanuric acid level in an outdoor pool should be maintained within the range 30 – 80ppm with 40ppm being ideal. If the Cyanuric acid level is too high (approaching 100ppm), it will have the effect of “locking” the chlorine sanitizer and stopping it from working. As cyanuric acid doesn’t evaporate from the pool water high levels may build up over time and can only be reduced by dilution with fresh water.

**Cyanuric Acid levels should be checked monthly.**

### **Phosphates:**

In the UK most water companies dose ortho-phosphoric acid to mains water so as to suppress lead from leaching into mains water from old pipework. This, together with phosphates arising from other sources, (including garden fertilizers, washing detergents and pool chemicals), breaks down into organo-phosphate which is a primary nutrient for algae and bacteria. By maintaining phosphate levels below 100ppb (parts per billion) algae bloom can be stopped and the pool sanitizer supported in suppressing bacterial infection. Harmless Lanthanum based formulations which work with the pool filter system to remove phosphates, are widely available.

**Phosphate levels should be checked at least fortnightly.**

### **Chloramines:**

Chloramines are a very unwelcome and unhealthy by-product of using chlorine for pool water sanitation. Chloramines have no disinfecting properties, are smelly (normally accounting for the chlorine-like smell arising from poorly maintained chlorinated pools) and trichloramine, which is the most damaging form of chloramine, has been proved to irritate and damage lungs when inhaled and is considered to be responsible for triggering asthma attacks in some people. Trichloramine also attacks metal and has caused a number of pool building roof and ducting collapses around the globe over the years. Trichloramine is created as a result of the accumulation of highly acidic bacteria in filter media particularly sand and zeolites which provide a comfortable home in which bacteria can get a foot-hold and thrive. A much better alternative filter media is available - AFM™ is especially “activated” so as NOT to provide bacteria with a comfortable home in which to thrive and as a consequence **pools using AFM™ do not develop trichloramine problems**. AFM™ has another HUGE advantage over sand / zeolites in that it doesn’t need replacing for the life of the filter vessel (subject to weekly backwashing) whereas sand / zeolites should be replaced every couple of years or so (yearly for busy pools). The obvious solution to suppressing chloramines is to replace sand / zeolite filter media with AFM™ instead.

In order to “break” the presence of chloramines in chlorinated pools, standard practice has been to shock pool water with a hefty dose of chlorine raising the free-chlorine level to ten times the normal level. There is much debate about the wisdom of using chlorine to perform this task and even for the experts it’s difficult to perform properly and in any case results in long periods of pool downtime while the chlorine level retreats to safe bathing levels. An alternative is to use a chlorine-free oxidizer to perform this task (viz: potassium monopersulphate) which requires a much shorter pool downtime before the pool is safe to bathe in again.

**Test for Chloramines (combined chlorine) weekly - Pools should be shocked at least fortnightly (weekly for busier pools).**

**If the pool is under builder’s warranty it is extremely important to keep a (weekly) record of water balance testing and adjustments made in order to prove warranty compliance should the need arise to claim**

**...and especially for spa owners:**

Spa water must be changed at least every 3 months and the spa thoroughly cleaned. Irrespective of the water sanitation system used, when performing this task it is imperative to clean internal spa plumbing. This can be done easily by dosing a plumbing cleanser to old spa water and circulating for a period of time (with the filter removed) prior to sending the water to waste.

***The importance to health and wellbeing of performing this simple task cannot be emphasized enough!!***