

## Pool Water – A Problem Solving Guide

Accurate diagnosis of pool water problems can be difficult. It's a case of considering the possibilities and identifying the most likely cause from other evidence, e.g. water tests, appearance of the water, the condition of the pool surfaces, etc. Read the causes for each symptom and pick the most likely suspect - if that doesn't solve the problem; try the next most likely.

### WATER CLARITY PROBLEMS

**Cloudy/Milky Water.** There are four possible suspects - your test kit will give you the best idea as to which is the most likely to be guilty.

**1st suspect** Suspended particles give a milky white discolouration to the water. This will probably be due to precipitation of dissolved mineral as a result of high pH or total alkalinity, or both.

**Cure:** - Reduce the pH or alkalinity using acid. To lower pH, add hydrochloric acid at a rate of 1 litre per 50 cu m of pool water. Repeat daily until correct reading is reached. To correct alkalinity, the dose should be doubled. Run the pump for 4 hours after dosing.

**2nd suspect** Build up of dirt and bather pollution due to low chlorine or poor filtration.

**Cure:** - Backwash filter, super-chlorinate to 10ppm and Flocculate.

**3rd suspect** The levels of stabiliser (cyanuric acid) are too high. The chlorine takes longer to kill organisms, which can then proliferate and lead to haziness in the water.

**Cure:** - Replace some of the pool water by draining to waste (or carry out an extra long backwash), top up with fresh mains water, then Super-chlorinate to 10ppm.

**4th suspect** The filter is blocked or is ineffective

**Cure:** - Check sand and replace if necessary.

**Cloudy/green Water. Caused by:** - Low chlorine levels or ineffective chlorine.

**Cure:** - Super-chlorinate to 10ppm to will kill the algae (25ppm for more serious problems). Brush all pool surfaces. Run the pump for 24 hours and backwash the filter periodically during this time. Any water haziness should be removed with flocculant. If the pool is susceptible to algae use algaecide monthly and super-chlorinate fortnightly.

**Rust-Red Water. Caused by:** - Ferrous fittings in the circulation system are being corroded by low pH water.

**Cure:** - Act very quickly to prevent consequential damage such as staining of the grout or liner - ferrous metals and chlorine are a bad mix. Contact your local pool dealer to see if it is safe to drain down and replace the water all in one go, or whether this should be done by progressive dilution. Remove any rust staining from the pool surfaces with a good tile or liner cleaner. Replace the ferrous metal fittings using PVC or copper. Ensure the fresh water is properly balanced.

**Strong Chlorine smell. Caused by:** - Insufficient chlorine! There's a surprise, eh? With insufficient chlorine in the water the 'combustion' of pollutants is not completed and the part-reacted compounds, known as chloramines, are left behind to irritate the bather. Chloramines are what made the old Municipal baths so smelly, and gave us all red eyes and itchy skin in the misty past.

**Cure:** - Super-chlorinate to 10ppm. Super-chlorination will react out the chloramines, leaving you with odour-free water and no eye discomfort. Don't you wish you'd paid more attention during Chemistry lessons?

### BATHER DISCOMFORT PROBLEMS

#### Stinging eyes, sore throat and skin irritation.

There are three possible causes - use your test kit to see which is the most probable.

**1st suspect** - A pH problem - the water could be too acidic or too alkaline. The pH of the eye is around 7.4-7.5 - anything above or below will irritate.

**Cure:** - Correct the pH.

**2nd suspect** - High combined chlorine (chloramines). Chloramines are an irritant. If you get unpleasant chlorine smells reminiscent of the old Municipal Baths its odds on that the problem is due to high chloramines.

**Cure:** - **super-chlorinate** the pool to 10ppm free chlorine to react out the chloramines.

**3rd suspect** - Incompatible detergents used for cleaning the pool sides and removing scum lines (tide-marks). The resulting reactions in the water can cause eye and skin irritation. Similar reactions can occur if soap or shampoo get into the water, e.g. if bathers jump in the pool to rinse.

**Cure:** - **Super-chlorinate** to react-out the detergents. Change to cleaners that are chlorine compatible or abandon their use and resort to a little elbow grease.

### **Blond or tinted hair turns green.**

**Caused by:** - Copper in the pool, either from copper-based algaecides or from corroding copper fittings in a heater.

**Cure:** - Correct the pH. Replace half of the pool water. Wash the affected hair with aspirin solution.

### **Allergy to chlorine.**

**Possible causes** - Be sure that you really are suffering from an allergy and not something else. The discomfort you feel could be due to other factors. E.g., it may be due to incorrect **pH** or excessive **chloramines**. See '*Stinging eyes, sore throat and skin irritation*' above. Be your own guinea pig - use another pool sanitised with chlorine and see if you get the same reactions. If you don't, your problems are probably more to do with your pool water.

Chloramines are formed by the breakdown of nitrogenous compounds such as perspiration, cosmetics, mucus etc. when reacting with free chlorine. The chloramines are eventually broken down to form harmless substances. All this usually happens in the pool water but the reactions can take place on the skin if, e.g., you have been exercising or sweating. Wash those nitrogenous compounds from your skin by showering before entering the pool. You will find the pool water much more comfortable (and reduce your chlorine bills!).

If these suggestions don't help, then you may be one of the very few who experience an allergic reaction to chlorine. An allergy is a hypersensitivity to a substance. Chlorine is unlikely to be the original or primary allergen, but those suffering from allergies can, unfortunately, find themselves sensitised by chlorine.

**Cure:** - If you think you have a genuine allergy, then the only remedy is to change to a non-chlorine sanitiser. Some alternative sanitisers require the periodic use of chlorine.

## **CHLORINE LEVEL PROBLEMS**

### **Chlorine has been added, but there is no reading on the test kit.**

**Caused by:** - Chlorine level is too high and bleaches the test kit colouring agent. To confirm, see if you can smell chlorine at the surface, or repeat the test with only a droplet of pool water in the test tube and watch closely to see if there is a discolouration before the bleaching occurs.

**Cure:** - Determine the approx level of chlorine by diluting the sample of pool water with an equal quantity of distilled water; multiply the result by 2. If there is still no reading, repeat the process and multiply the answer by 4...and so on.

If the actual chlorine reading is below 10ppm suspend dosing and allow it to drop over time. If higher, or you need to use the pool soon, add sodium thiosulphate to reduce free chlorine. **WARNING** The dose rate is 250 grams per 50 cubic metres. Apply in several smaller additions, testing after each dose. If overdosed, sodium thiosulphate can give you a chlorine deficit for weeks.

### **The chlorine level is difficult to maintain.**

**1st suspect** - Free chlorine is being decomposed by UV from the sun.

**Cure:** - For pools using liquid chlorine (sodium hypochlorite) or calcium hypochlorite, add stabiliser (cyanuric acid) at a rate of 500 grams per 50 cu metres. Dose directly into the pool, **NEVER** pre-mixed with the chlorine. Alternatively, switch to stabilised chlorine - dichlor or trichlor in granules or tablet form.

**2nd suspect** - High water temperature. Bugs prefer warm water and breed quickly - more bugs create a higher chlorine demand. As a rough rule of thumb - if the pool water temperature goes above 26 degrees C, the chlorine demand will double for every 5 degrees.

**Cure:** - Increase the dose rate of chlorine proportionately.

**3rd suspect** - Chlorine levels have been low, there has been a build-up of pollutants, and therefore an increase in chlorine demand.

**Cure:** - Super-chlorinate to 10ppm free chlorine.

## WATER BALANCE PROBLEMS

### pH remains below 7.2.

**Likely cause:** Usually due either to low pH of mains water (soft water areas) or to the use of an acidic chlorine donor, such as trichlor.

**Cure:** - Correct the pH.

Consider changing to a high pH chlorine source to help achieve a natural balance between the low pH of the incoming water and the high pH of the chlorine donor. Trichlor is low pH, Dichlor is roughly pH neutral; calcium hypochlorite and sodium hypochlorite are high pH chlorine donors.

### Tendency for the pH to be permanently high (above 7.6).

**Likely cause:** This is due to either **(1)** high pH of mains water (hard water areas) or **(2)** the use of alkaline chlorine donors such as calcium or sodium hypochlorite, or **(3)** hardness salts being leached from new concrete or mosaic pools.

**Cure:** - The remedy is the same whichever factor is at work here - correct the pH.

For **(1)** or **(2)**, consider changing to a low pH chlorine donor to help achieve a natural balance between the high pH of the water and the low pH of the chlorine donor. Trichlor is the obvious chlorine donor to choose. For **(3)**, the difficulties with new pools will clear up of their own accord given sufficient time.

### pH values are erratic and fluctuate.

**Likely cause:** Total Alkalinity is too low to buffer the pH.

**Cure:** - Add sodium bicarbonate to ensure total alkalinity remains above 100ppm. The dose rate is 1.5kg per 50 cu metres of pool water.

### pH is locked.

**Likely cause:** The water is over buffered due to high alkalinity. This is a not uncommon problem in hard water areas where the mains feed water has a high total alkalinity.

**Cure:** - Add dry acid (Sodium bisulphate) to lower the total alkalinity to below 200ppm. The dose rate is 1kg per 50 cu metres of pool water. Add the acid a little at a time, pre-dissolved at a dilution no stronger than 8:1.

### Tendency towards low alkalinity.

**Likely cause:** The local feed water is low in bicarbonates and, whenever the pool is topped up, bicarbonates in the pool are diluted. This is a particular problem in soft water areas.

**Cure:** - Add sodium bicarbonate to raise total alkalinity to around 100ppm. A dose of 1.5kg per 50 cu m of pool water should raise the level by 20ppm.