

# POOLMASTER



Hydrosmart

Natural pool water treatment technology.



Hydrosmart Treated Pool

## BENEFITS DUE TO HYDROSMART RESONANCE FREQUENCIES

- Swimmers enjoy a natural pool much like a stream or river in its feel and lack of smell
- Less money, work and maintenance due to stable water needing no pool chemical company maintenance visits
- Stabilization and control of pH levels closer to the neutral range Improved water clarity
- Soft Water in hard water areas
- No or very low pH balancing chemicals (Acids or Alkalis) need be added to maintain stable pH levels
- Free chlorine levels maintained with 40% to 70% less chlorine dosing due to lower TDS and reduced pH buffers.
- Sand and Glass filters and filter media, de-scaled and cleared of biofilm build up.
- Significantly reduced back flushing times and volumes for filters.
- Back flush water has greatly reduced TDS and chloride levels and is suitable for irrigation
- Filter media maintained in optimum condition on a day to day basis.
- Particle size reduction and greatly reduced TDS levels result in excellent water clarity without clarification chemicals.
- Algae and fungal control without additional chemicals
- Corrosion Prevention
- Scale prevention and removal on all immersed surfaces
- Stain removal on immersed surfaces
- Significant Chloramine odor reduction
- Significant health benefits due to lack of chemically induced skin and eye irritations
- Works on manually run or automatic dosing

## **OVERVIEW OF SWIMMING POOL TREATMENT ISSUES**

Because of the potential for disease cross contamination between swimmers, it is always important that a minimum residual disinfection level be maintained in all swimming pool circulations so that the risk of bacterial build up and infection of other pool users can be minimized. Traditionally the main disinfection method has been chlorine or to be more accurate free chlorine, which is the version that actually kills bacteria.

### **CHLORINE DOSING**

Chlorine is available as either sodium ( liquid ) or calcium hypochlorite ( solid granular/tablet ) and in order for this compound to convert efficiently to free chlorine, the pH of the pool water has to be maintained within an ideal range of 7.2 to 7.6. Under normal conditions of pool use there are significant swings in pH as a result of the interaction of organic matter like dirt, leaves and insects that enter from the pool surrounds plus the swimmers themselves introduce loads from their skin hair, bacteria, urine etc.

### **CHEMICALS FOR pH CONTROL**

This means that other chemicals get used to bring the pH within the desired band of 7.2 - 7.6 Acids are used to bring the pH down and Alkalis are added to bring the pH up. Therefore a constant chemical balancing act is taking place whose sole purpose is keep the pH within the optimum range for the Sodium or Calcium Hypochlorite to convert efficiently to free chlorine.

### **CONSTANTLY RISING TDS (Total Dissolved Salts/Solids)**

The chemical interactions of the pH balancing chemicals are short lived and so the chemicals have to be re-applied on a regular basis, frequently by using automatic monitoring and dosing systems. Unfortunately the by-products of these reactions remain in the water causing an ever increasing mineral and chemical load in the pool water, which results in rapidly rising TDS ( Total Dissolved Salts ) levels.

## UNDESIRABLE CHEMICAL INTERACTIONS

As a result of the increasing chemical and organic load a large percentage of free chlorine reacts with the minerals to form chlorides and with the organic load to form chloramines, di-chloramines and trihalomethanes (THM's). This leaves very little free chlorine left to control the bacteria. Consequently even more hypochlorite has to be dosed in order that the minimum free chlorine levels can be maintained. This requires even more pH balancing chemicals in addition to other chemicals required to control algae blooms and fungal moulds.

All this has been good news for the pool chemical companies for years but not for the swimmers, the pool operators, the pool maintenance staff or the environment. Often the chemical load becomes offensive to the pool users and causes child and adult skin and eye irritations, bleached costumes etc. Pool operators suffer from high chemical costs, accelerated rates of corrosion, high maintenance costs and the environment suffers from back flush water which is high in chloride salts so it goes down the drain rather than for irrigation.

In an increasingly health conscious, water deficient world it is not surprising that there is growing demand for alternative ways to treat pool water which are user friendly, cost effective and environmentally sustainable. In private pools there is no statutory requirement to maintain minimum free chlorine levels in most countries but it is a confusing array of technology to select one that will really work well long term with maximum benefits and minimum effort to maintain.

In Public pools there is a mandatory requirement to maintain minimum free chlorine levels in the pool water. This is set at differing levels in different countries. By the small band of pH variance for chlorine to be effective, high levels of pH balancing chemicals are often used which in turn elevates the water's TDS, this then requires greater levels of chlorine dosing to be effective ( a bit of a vicious circle ).

*HYDROSMART WATER CONDITIONING WHEN COMBINED WITH LOW CHLORINE PRODUCES VERY STABLE OPTIMUM POOL HEALTH*

## POOLMASTER TECHNOLOGY

Poolmaster uses a back to basics 'bond breaking' approach that gets to the heart of the problems caused by the interactions between the mineral, chemical, and organic matter simply, just by reducing particle size.

### THE ORIGINS OF HYDROSMART TECHNOLOGY

Originally it was developed to resolve severe corrosion problems. Corrosion involves chemical interaction between a wide variety of minerals and chemicals in water. Particle physics was adopted as it was important to try and control or inhibit these chemical reactions without chemicals in order to resolve the corrosion issue which is precisely what the technology achieves.

### HOW IT WORKS

Hydrosmart uses a highly specific series of computer generated resonance frequencies to inhibit the electron bonding process that drives most chemical interactions. The resonance frequencies are imparted to the flow ( see diagram below ) via a set antennae coils, wound around the outside of the water pipe. Once in the water, the resonance frequencies disrupt the abilities of electron pairs to form in elements and compounds. This greatly reduces many of the chemical interactions that normally would take place in the treated water body. The frequencies also compromise the bonding ability of the targeted mineral and chemical groups causing them to revert to much smaller and much less reactive, sub 4-micron particles



## What is pH about in pools ?

pH is in essence a barometer of the chemical activity taking place.

If chemical activity is tending towards the alkaline range of chemical compounds then pH tends towards the higher end of the scale ( upwards of the neutral pH of 7 ) and if the chemical activity is acidic in nature then pH will tend towards the lower readings ( downwards of 7 ). When the chemical activity is roughly in balance then the pH readings will show up in the neutral range, where a pH of 7.2 to 7.6 is considered to be desirable for chlorine to be most effective.

## pH STABILISATION

Hydrosmart treatment inhibits a large portion of the chemical reactions that would normally otherwise take place and causes many of the compounds that have already formed, to break down to much less complex entities. The net effect will be to dampen down most of the chemical activity that had been taking place in the water body. This has the effect of naturally stabilizing the pH as the chemical interactions that normally cause the pH to shift are no longer taking place.

## AUTOMATIC DOSING EQUIPMENT

Use of automatic dosing systems to set minimum chlorine dosing levels can be a good companion as they automatically add levels which are set by the pool user and their probes sense when the chlorine and pH need any attention.

For example the Chemigen D52 auto dosing unit has a pH probe and both chlorine and acid injection modules and allows for the acid dosing to be turned off so it is only dosing chlorine or acid if and when the pH or chlorine doser is switched on.

*This may well be hard to take on board but it should be remembered that the sole purpose of pH balancing chemicals is to facilitate the efficient production of free chlorine and as the free chlorine levels have actually increased there is no longer any need for the pool to be controlled by as many chemicals **so a reduced dosing outcome now is created.***

## **REDUCED CHLORINE DOSING**

It is still important in Hydrosmart treated pools for Chlorine dosing to take place but much less chlorine is needed due to the lower TDS of the pool. The reason for this is that the majority of the chemical reactions between the chlorine and the mineral load of the water, (that form chlorides, and the reactions with the organic material, that forms chloramines, and THM's), are no longer taking place and so the free chlorine levels can remain higher to be effective at their job.

## **WATER CLARITY**

There is a progressive improvement in water clarity that accompanies the application of Hydrosmart treatment.

Due to the reduction in particle size of the minerals, chemicals and organic matter in the pool water.

Large particles will absorb or scatter light making the water look murky, whereas tiny particles allow the light to pass through largely uninterrupted.

A further improvement in water clarity occurs if algae is present and as this progressively gets removed by the treatment due to more effective free chlorine impact.

On the next pages is a series of photos taken over 10 days of the pools commissioning in Thailand.

The use of twin sand filters and low dosing of hypochlorite shows clarity improving over the 10 days of shots taken and with the pH stabilized between 7.2 and 7.5 it has remained in constant good health over 5 years in a warm tropical environment since the pool was commission with free chlorine levels which are maintained at 1.3 ppm and 1.5 ppm.

## Resort SWIMMING POOL Thailand

Commissioning - Day 1 - Pool filled with Mains water from Bang Seng Mains Water Supply



DAY 4 of Hydrosmart Treatment



**DAY 7 of Hydrosmart Treatment**



**DAY 10 of Hydrosmart Treatment**





## **POWER CONSUMPTION**

The resonance frequencies have to be extremely accurate and generated in a specific order. This can be achieved using a microprocessor to generate the signals digitally. This means the Hydrosmart system itself uses very little power and can run full time, maintenance free, for under \$10 per year.

## **DE-SCALING AND BIOFILM REMOVAL**

The frequency effects remain active in the water for many days unless cancelled out or distorted by a strong external electromagnetic field. In the case of swimming pools and other applications where the body of water is circulating, the frequency treatment is renewed constantly. This allows the bonds of any scale or other deposits that have built up in the pool's circulating, filtration and heating system to be loosened and removed. As a result any equipment in contact with the treated water will be progressively de-scaled and along with it, all the pathogens and bio-films that attach themselves to the scale. It is therefore important to back-flush the filters at regular intervals during the first eight weeks of treatment on an existing pool being retrofitted, that way the removed matter can be taken out of the pool circulation.

## **THE SIGNIFICANCE OF PARTICLE SIZE**

The reduction in particle size to below 4 microns of the minerals and chemicals, contained in the treated flow, has proved to be highly significant and offer substantial improvements for both the pool operators and their customers in terms of a healthier water environment, accompanied by a big reduction in operating and chemical costs.

## **REMOVAL OF ALGAE AND FUNGAL FORMATIONS**

Algae and most fungal formations are impacted swiftly by Hydrosmart softening of the water and making the free chlorine better available to powerfully impact the algae and prevent its growth. This combines with de-scaling/scale prevention of tiled surfaces and pipe work on which mold and fungal related conditions can breed and thrive, making them naturally dissipate along with the calcium substrates if applied to a retrofit pool environment and providing prevention of new pools surfaces to keep water in good health more simply, long term and naturally.

## SOFT WATER

Research has shown hard water is due more to size of the mineral crystals than the TDS levels by which water hardness is normally measured. By breaking down the large mineral and chemical compounds such as chlorides, carbonates and bicarbonates, into tiny particles, the treated flow assumes all the attributes of chemically softened water without any of its running costs or environmental consequences.

Not only is the water a pleasure to swim in, but the entire pool circulation and filtration system will now be operating in a non-corrosive, scale free, soft water environment which results in a wide range of maintenance benefits. Pool heating systems can become scale free and consequently use less energy. Pumps no longer corrode with reduced cavitation, which minimizes vibration, improves their efficiency and puts less stress on the shaft bearings.

## PATHOGEN CONTROL AND CHEMICAL DOSING

The reason why Hydrosmart is so effective in swimming pool treatment is that without the resonance frequencies, between 40 and 70% of chlorine dosing, will react with the organics, minerals and human load, (hair skin, sweat, body fluids, and faecal matter), to form chlorides and chloramines, none of which kill bacteria.

**Only free chlorine is capable of pathogen control.**

**Consequently only a small portion of the chemical dosing stays as free chlorine and the remainder just loads up the chemical content of the water.** This in turn irritates or burns the eyes and skin, bleaches expensive swimming costumes and unbalances the pH, so that even more chemicals have to be added to keep the pH within the ideal range for chlorine dosing.

HYDROSMART treatment prevents most of these chemical interactions from taking place. Consequently, chlorine remains as free chlorine for longer without converting to chlorides or chloramines and so much less is required to kill the same amount of bacteria while the pool smells clean without smelling like a chlorine treated pool- amazing !