



CWS White Paper

Sphagnum Moss and Salt Chlorination
The Effects of PoolMoss[®] on Salt
Chlorination Systems

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Introduction

Salt generation of hypochlorous acid for pool sanitation is a popular method in both home pools and some commercial pools. It really should be called hypochlorous acid generator and not a salt generator since the process makes the same active molecule that can be added to the pool with many different liquid and solid chlorine products. The salt generator passes a current of electricity across metal plates that create an electrolysis reaction when sodium chloride (table salt) is present in the pool water at the required concentration. The electrical current causes local chemical reactions inside the generator that cause formation of hypochlorous acid that is delivered to the pool water. Like most things in life, this useful chemical reaction is accompanied by undesirable side effects such as scale formation on the metal plates within the generator and formation of sodium hydroxide (a strong base) that causes pH within the pool to rise.

Depending on the chemical composition of the local water, a lot of scale can accumulate between the plates. This usually starts at the inflow end of the salt generator and progresses across the plates. Once scale has formed, the effective surface area of the metal plate electrodes is decreased. Scale formation is also affected by the amount of electrical current needed to produce enough hypochlorous acid to achieve the desired concentration in the pool. In pool terms this is the Free Available Chlorine (FAC) that you measure with pool water test strips. Turning up the power on the generator, delivers more current to the plates that in turn makes more hypochlorous acid, more scale and more sodium hydroxide. The build up of scale takes some time, so there is usually a gradual increase, sometimes over a couple of years, of scale that inhibits the efficiency of the electrolytic process.

There are two ways to deal with the scaling process. Commercial pool generators have an electrode stack that can be removed for cleaning. One local commercial pool with a hypochlorous acid generator has to remove the stack and soak it in acid every other week to remove the scale so enough hypochlorous acid can be made to maintain FAC levels. This process not only takes time, but recurrent acid treatment gradually removes the metal on the surface of the electrodes. When enough of the metal is gone, they need to be replaced. A costly proposition.

Residential users of hypochlorous acid generators have a more difficult time because their units usually are hard plumbed into the pool circuit and the metal plates cannot be removed. When they become severely scaled, the whole unit needs to be removed and either replaced or cleaned with acid.

pH changes in the pool water from the formation of sodium hydroxide require addition of acid to keep the pool water from becoming too alkaline. Commercial generators often have acid feeders to keep the pH in check. Residential pools require frequent checking of the pH and appropriate addition of acid or pH down.

PoolNaturally®

PoolNaturally® works very well with all types of hypochlorous acid “salt” generators. Using PoolNaturally® decreases the organic contamination on all the pool surfaces including the hypochlorous acid plates and in the filter. Organic contamination affects the hypochlorous acid generator in many ways. It binds hypochlorous acid removing FAC from the pool water. To maintain a desired FAC more hypochlorous acid must be made. To accomplish this the electrical current to the generator must be increased.



As more and more organic contamination accumulates on pool surfaces and especially in the filter, higher and higher current is needed to keep up with the chlorine demand. PoolNaturally® inhibits the formation of organic contamination so it inhibits the binding of FAC. This allows lower current settings on the hypochlorous acid generator. Lower current decreases scale formation and saves energy. Most customers who use PoolNaturally® report they can achieve effective FAC levels with 80% lower current settings.

PoolNaturally® also inhibits scale formation on every surface of the pool including the electrode plates in the hypochlorous acid “salt” generator. PoolNaturally® affects scale formation in two ways. PoolNaturally® absorbs metal ions such as calcium, magnesium, and iron into the leaf structure. Less metal ions result in less scale formation. PoolNaturally® also inhibits scale formation by inhibiting organic contamination. Scale formation requires a nucleation site for the crystals of scale to form. Just like snowflakes require a microscopic piece of dust to start ice crystal formation, scale requires a spec of organic matter to start crystal formation. By inhibiting organic contamination, PoolNaturally® inhibits scale formation.

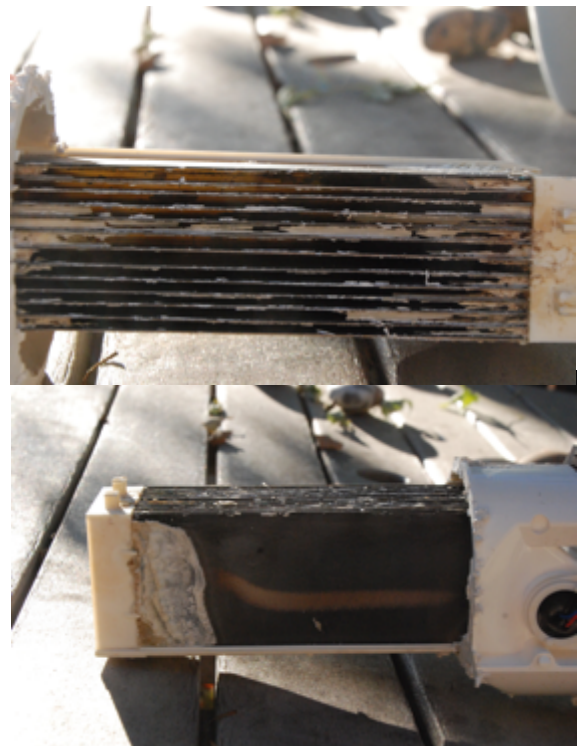
As a result, the hypochlorous acid generator unit works more effectively and requires less maintenance.

Recreational and commercial pools with hypochlorous acid “salt” generators that use PoolNaturally® Plus, report minimal scale formation over years of service. By eliminating the need for acid washes to remove the scale, the hypochlorous acid “salt” generator is more efficient, lasts longer and uses less electricity to achieve the necessary FAC level.

Swimming Pool without PoolNaturally®



Swimming Pool with PoolNaturally®



PoolNaturally® also stabilizes pool water pH. It does this by adding buffers to the pool water that stabilize pH and by naturally adding hydrogen ions to the water. When PoolNaturally® absorbs a metal ion it releases a hydrogen ion into the water. Hydrogen ions make the water more acidic, thus counteracting the basic sodium hydroxide that is produced by the electrolysis process. As a result, pH remains stable requiring less chemical addition to maintain proper pH.

PoolNaturally® also significantly reduces corrosion on metal pool surfaces and deterioration of pool liners. Over time, this results in less pool maintenance and replacement costs.

Conclusion

Hypochlorous acid “salt” generators and PoolNaturally® were made for each other. As one satisfied customer in Minnesota reported, “I open my pool, turn on the generator, fill the contact chamber with PoolNaturally® and enjoy the pool all summer long”. “Last year, I didn’t have to add anything to the pool except some water”.

A commercial pool operator using PoolNaturally® Plus along with an offline hypochlorous acid generation system demonstrated the beneficial effects by discontinuing PoolNaturally® Plus after using it for two years. He reported that the electrolysis plates on the hypochlorous acid generator immediately started to accumulate scale resulting in frequent maintenance and acid baths to maintain function. He then restarted PoolNaturally® Plus and the system returned to its previous scale free status. He is adding PoolNaturally® Plus to all his pools that have hypochlorous acid generators to “protect his equipment and decrease maintenance.

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