How a Saltwater Chlorinator Works

Understanding the basics of a saltwater chlorine generator.

If you have a saltwater pool, it helps to understand a little bit about how a saltwater chlorine generator works. In this section we cover the basic components of a salt pool system along with the process of converting salt to chlorine.

The Basic Components of a Saltwater Chlorine Generator:

The Power Supply

This is a great big heavy transformer that provides DC current to the salt cell. It contains a transformer to step the voltage down from 240 VAC to 27 VDC (approx). It also contains rectifiers to chance the AC current to DC current.

The Control Box

This is the "brain" of the system, so to speak. It tells the salt cell when to turn on and for how long. It also monitors the flow sensor and the cell performance. It gives feedback to the user concerning the performance of the cell. In some cases, this can be integrated with your main pool control system.

The Salt Cell

The salt cell is a series of coated titanium plates that are sandwiched together with space in-between for the water to flow through them. As the mild salt water of the pool flows through the cell, the water conducts the DC from one plate to the next. As the electricity goes through the water, it converts some of the salt to chlorine. More information on that below.

The Flow Sensor

The flow sensor monitors the flow of water in the piping to insure that there is always water flowing through the salt cell when it is powered up. If the flow stops, the sensor will not permit power to go to the salt cell. This is a safety feature to keep the cell from creating powerful chlorine gas if there is no water moving through the piping.

The Process of Producing Chlorine from Salt

The process of converting chlorine to salt can best be explained with a chemical equation. If you understand this basic chemical equation, you will the importance of maintaining proper chemical levels in your salt pool.

H20 + NaCl ----------> HOCl + NaOH

Or to put it in plain English:

Water + Salt (Sodium Chloride) ----> Chlorine + Sodium Hydroxide

When you put water + salt through the energized cell plates, you end up with chlorine (hypochlorous acid) and sodium hydroxide.

Now, here are a couple of explanations you might find helpful:

Hypochlorous acid - this is the active form of chlorine in your pool water that is in every chlorinated pool, whether it be a tablet pool, a salt pool or a bleach pool.Chlorine in its purest form is actually a gas (remember mustard gas?) but when you dissolve it in water, you get hypochlorous acid.

Sodium Hydroxide - this is the byproduct of saltwater chlorine generation. The sodium that was in the salt has to go somewhere, so it combines with hydrogen and oxygen from the water and forms this substance.

Why should I care about sodium hydroxide? Sodium Hydroxide has a very high pH so when you are using a salt system, you will find your pH rising. If you don't manage your salt pool properly, you will create a LOT of sodium hydroxide and your pH will rise seemingly uncontrollably.

We will have more details about this the sections on saltwater pool maintenance and saltwater pool issues.