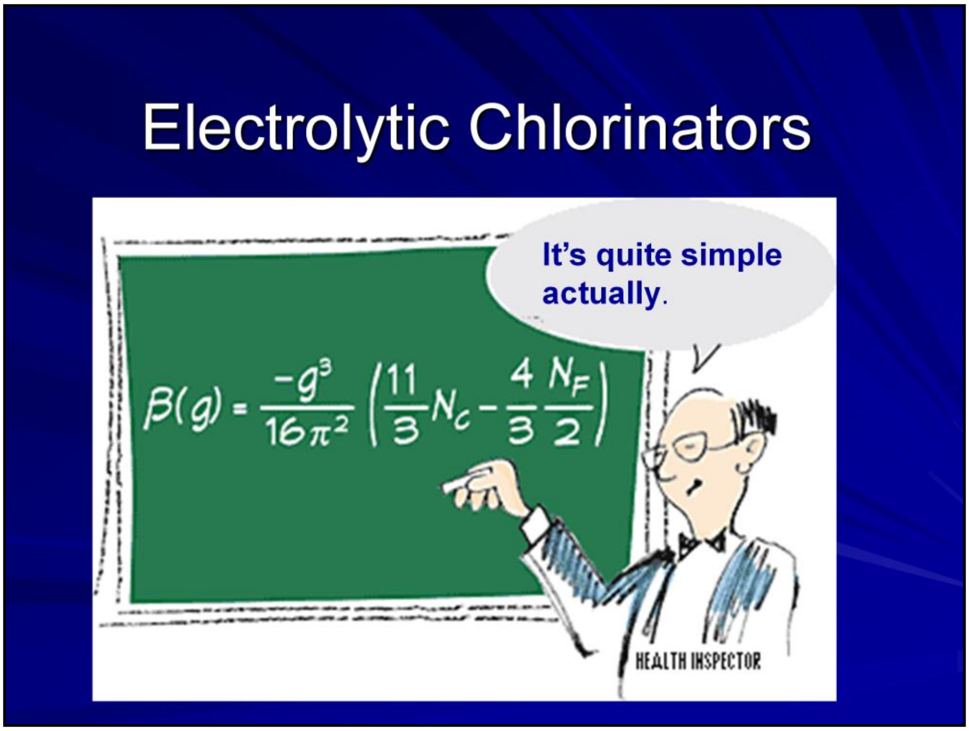
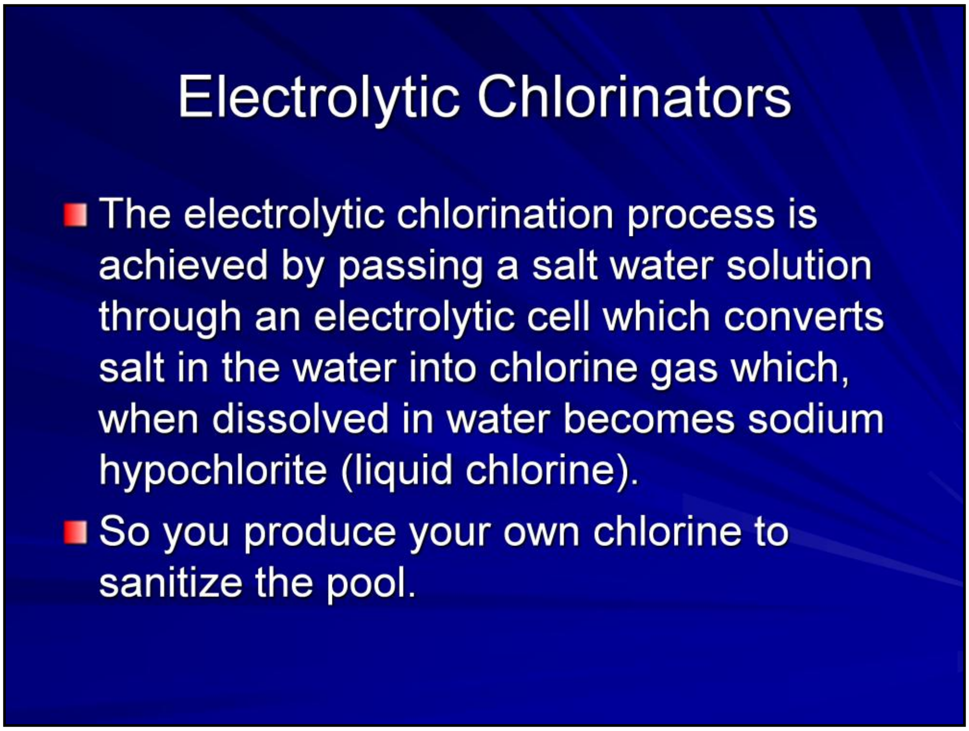
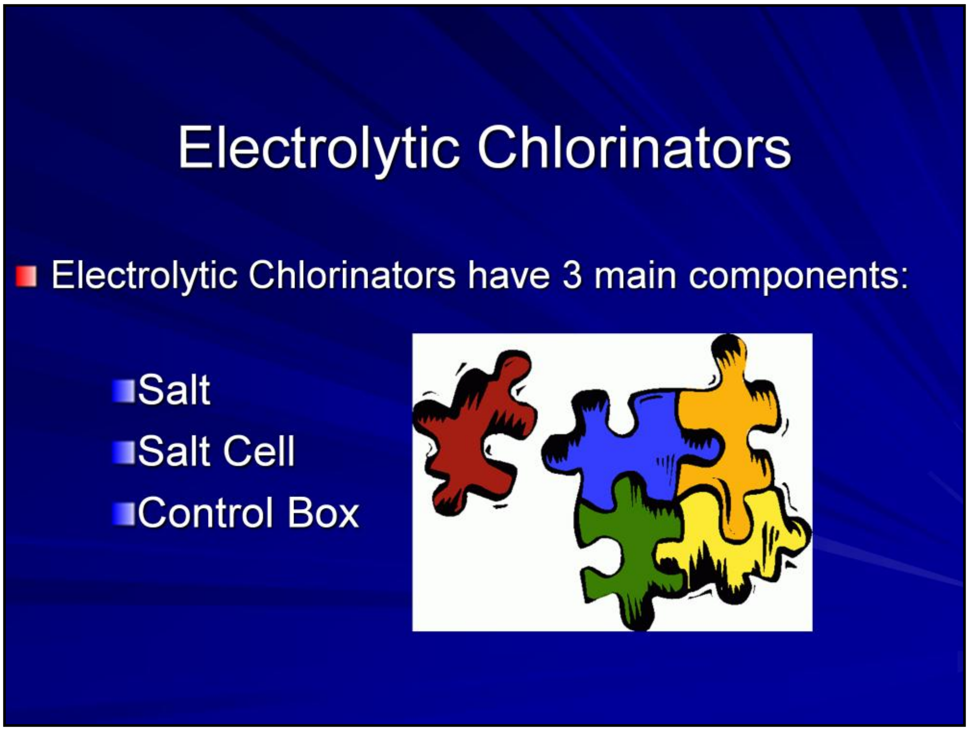


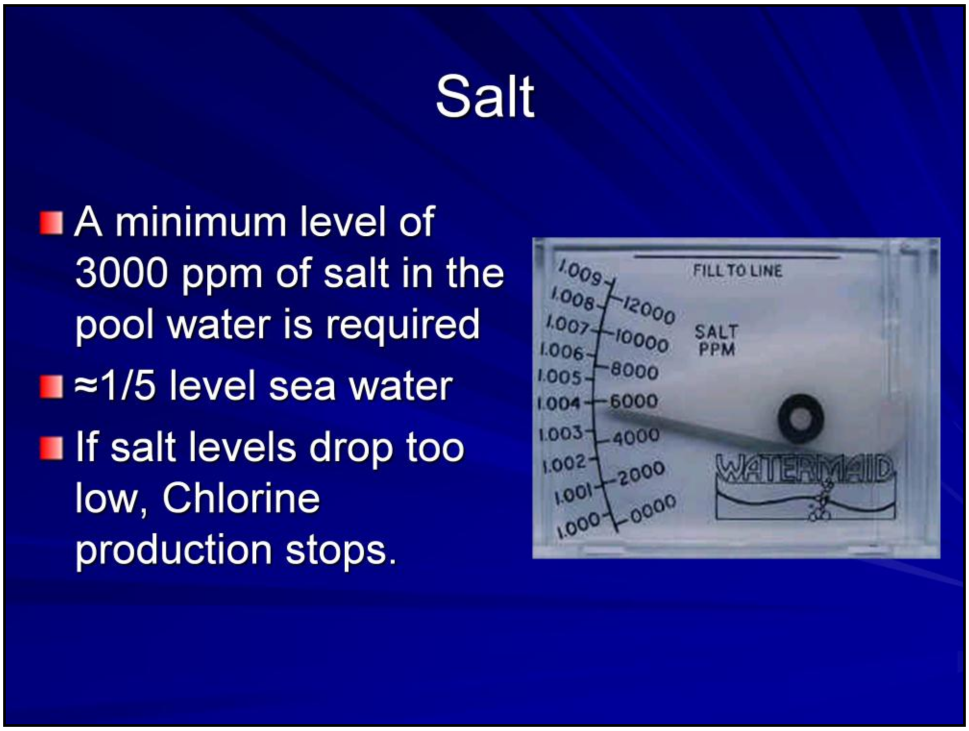
In this section we will discuss electrolytic chlorinators, what are also known as onsite chlorine generators.



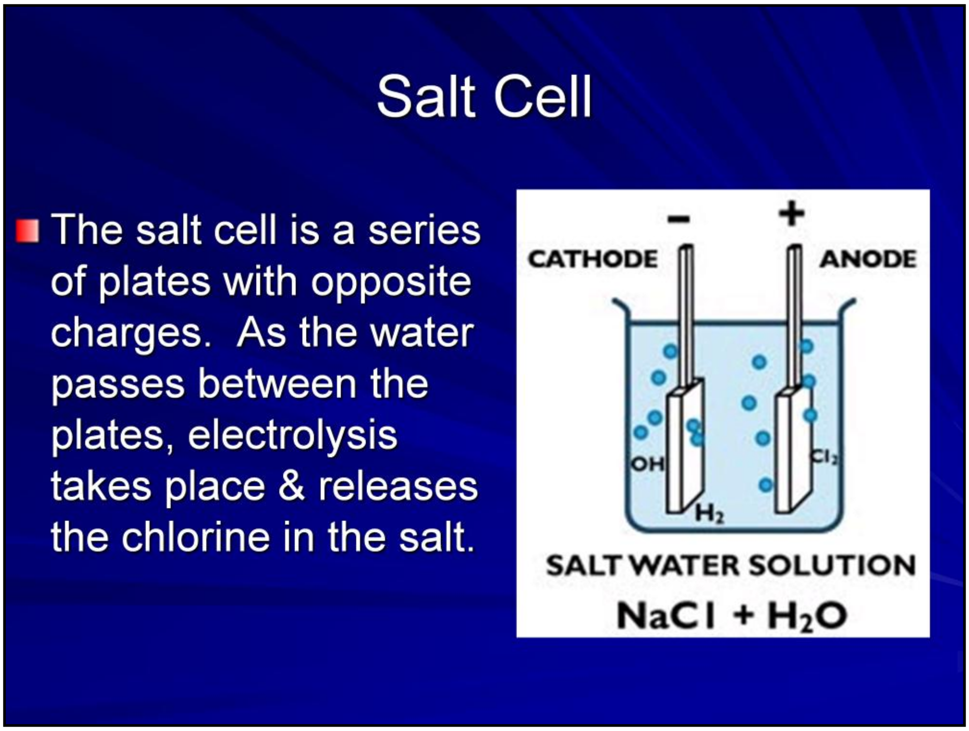
. The electrolytic chlorination process is achieved by passing a salt water solution through an electrolytic cell which converts salt in the water to chlorine gas which, when dissolved in water, becomes sodium hypochlorite, or liquid chlorine. In this way you’re producing your own chlorine to sanitize the pool.



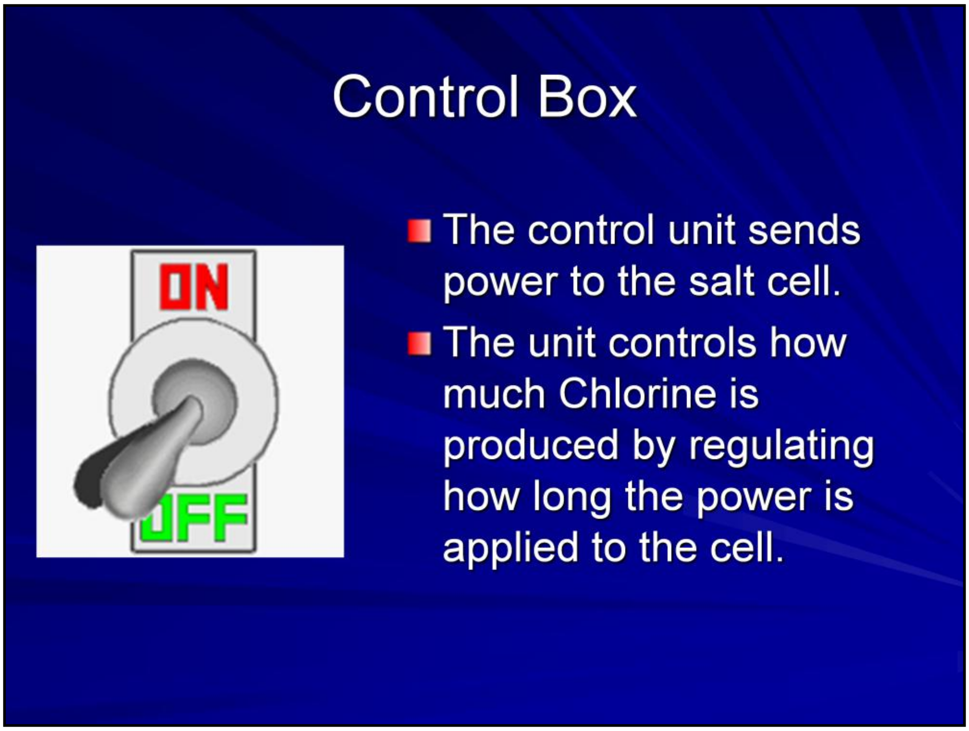
. There are three main components to electrolytic chlorinators. Salt is needed, and there should be at least 3,000ppm of salt or around 250 pounds for every 10,000 gallons of water. The salt cell, the second component, is what actually makes the chlorine. Salt is passed through the cell, which contains layers of plates that are electrically charged. The plates in the cell convert salt to free chlorine by a chemical process called electrolysis. The third component, the control box, keeps everything running.



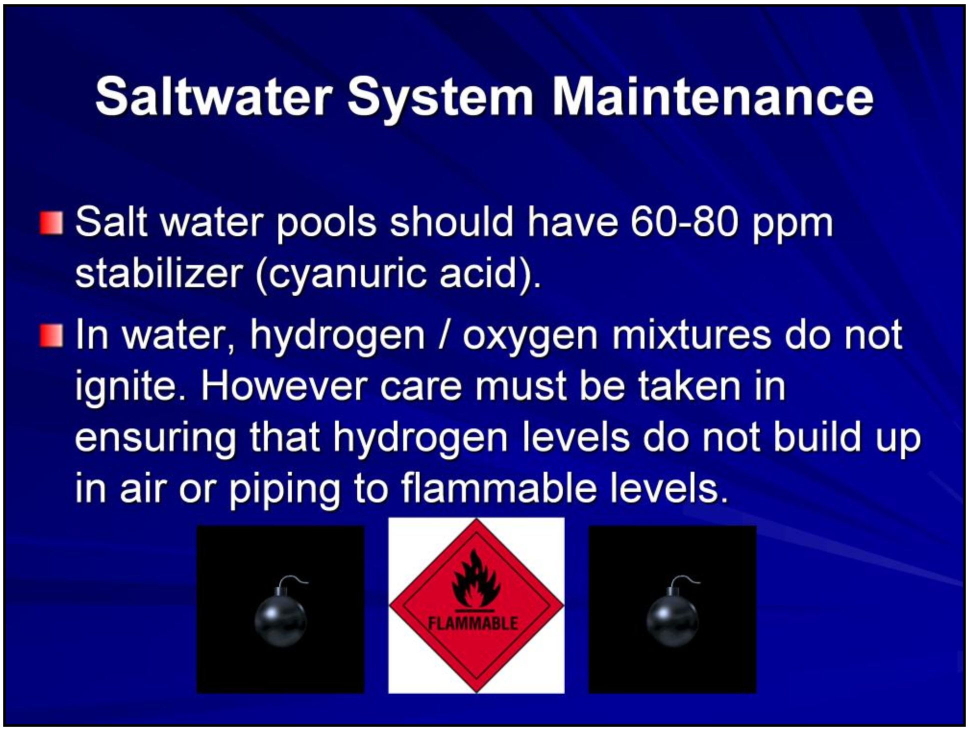
As I said before, a minimum of 3,000ppm of salt is required to maintain the system properly with adequate chlorine. This amount is equal to 1/5 the level of salt in sea water. Remember, if your salt levels drop too low, the production of chlorine will stop.



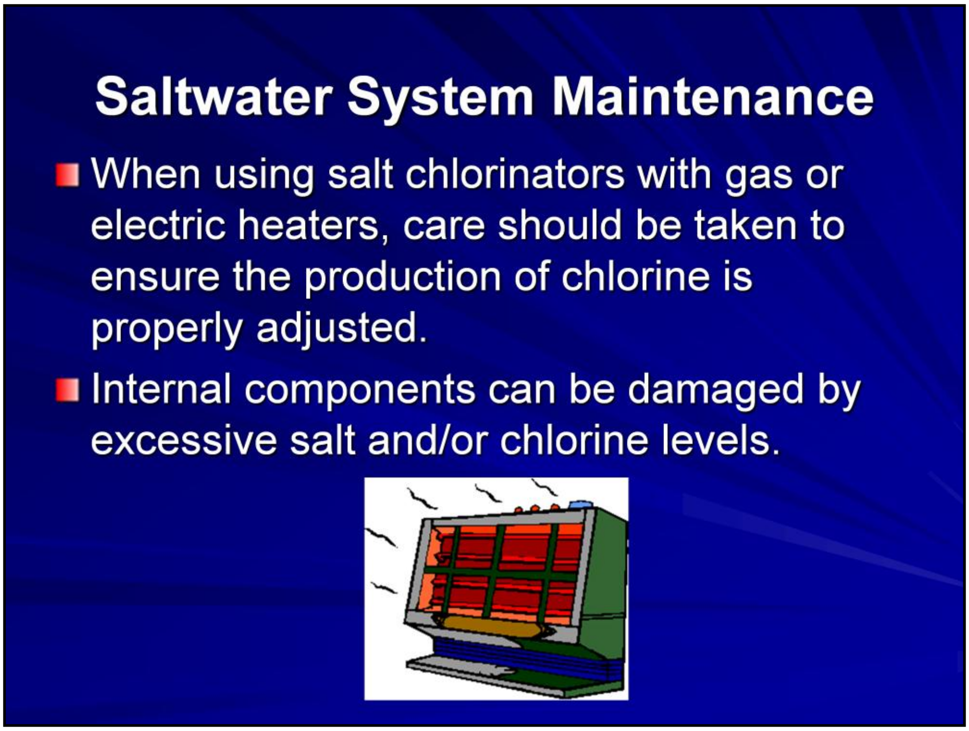
This is an example of the salt cell. The plates are oppositely charged, and as water passed between the plates, electrolysis takes place and releases the chlorine in the salt.



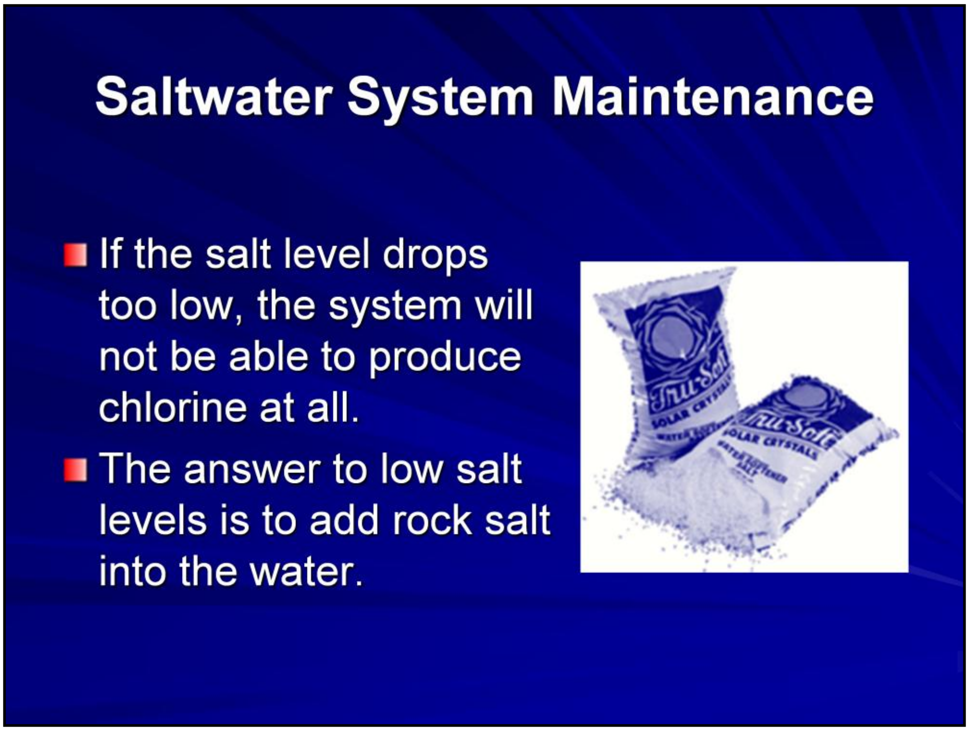
. The control box is the unit that sends power to the salt cell. The unit can control how much chlorine is produced by regulating how long the power is applied to the cell. The control box will also reverse the charges of the plates to prevent scale buildup on them.



Salt water pools should have around 60-80ppm of cyanuric acid to maintain proper levels. In water, hydrogen/oxygen mixtures don’t ignite. However, care must be taken in ensuring that hydrogen levels do not build up to flammable levels in the surrounding air or in the piping.



When using salt chlorinators with gas or electric heaters, care should be taken to ensure the production of chlorine is properly adjusted. Internal heater components can be damaged by excessive levels or chlorine and/or salt.

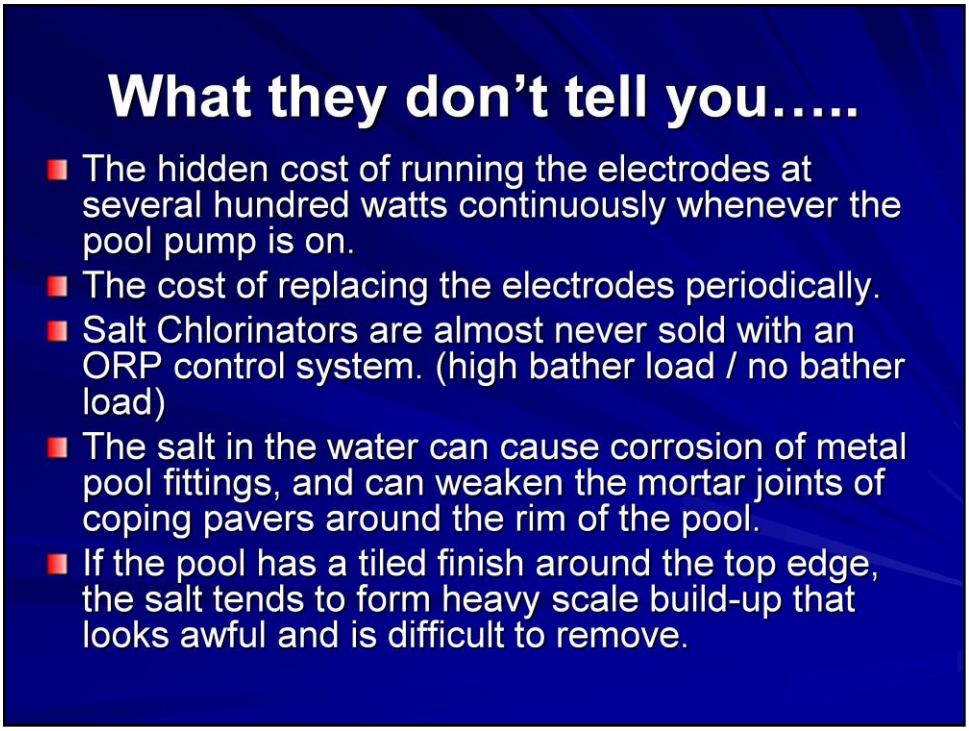


Remember, if the level of salt drops too low, the system will not be able to produce chlorine at all. Rock salt can be added to systems with low salt levels to quickly being them back up to adequate conditions.

Saltwater System Maintenance

- If the chlorine reading gets too low then it is important to superchlorinate the pool in order to quickly raise up the chlorine level to avoid unsanitary water.
- Simply adding more salt to the system WILL NOT be enough to solve the problem if you have a low chlorine level. That will enable the salt system to begin making chlorine, but will not immediately raise the chlorine level

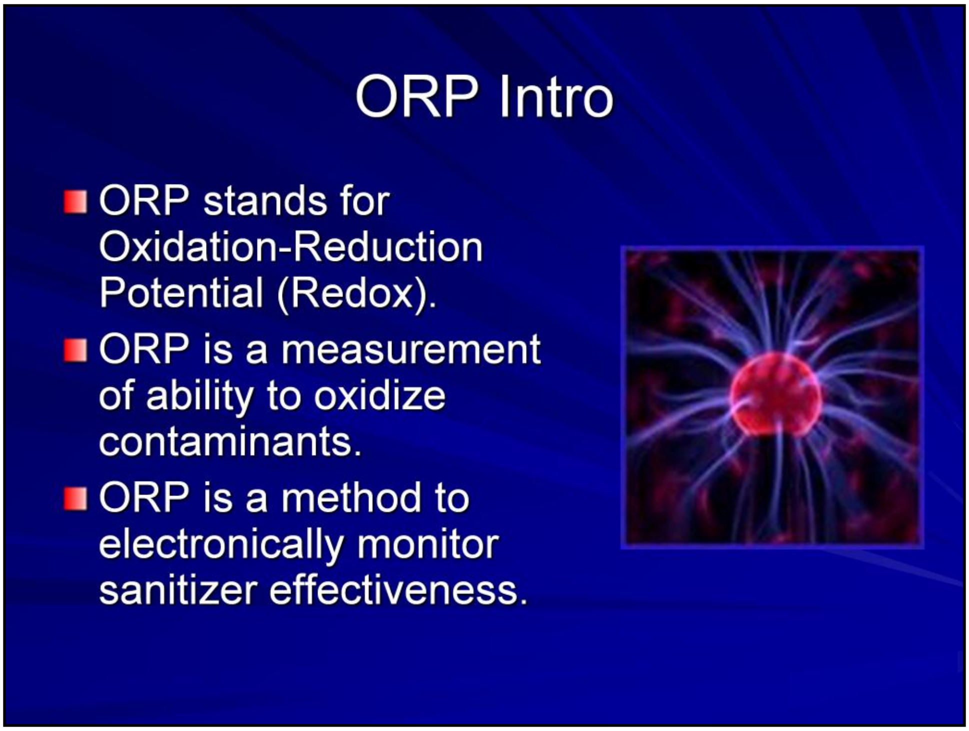
. If the chlorine reading becomes too low then you should superchlorinate the pool in order to quickly raise the chlorine level and avoid unsanitary water. Simply adding more salt to the system will not be enough to solve the issue if you already have low chlorine levels. Only adding salt will enable the system to start making chlorine again, but will not immediately raise the chlorine level.



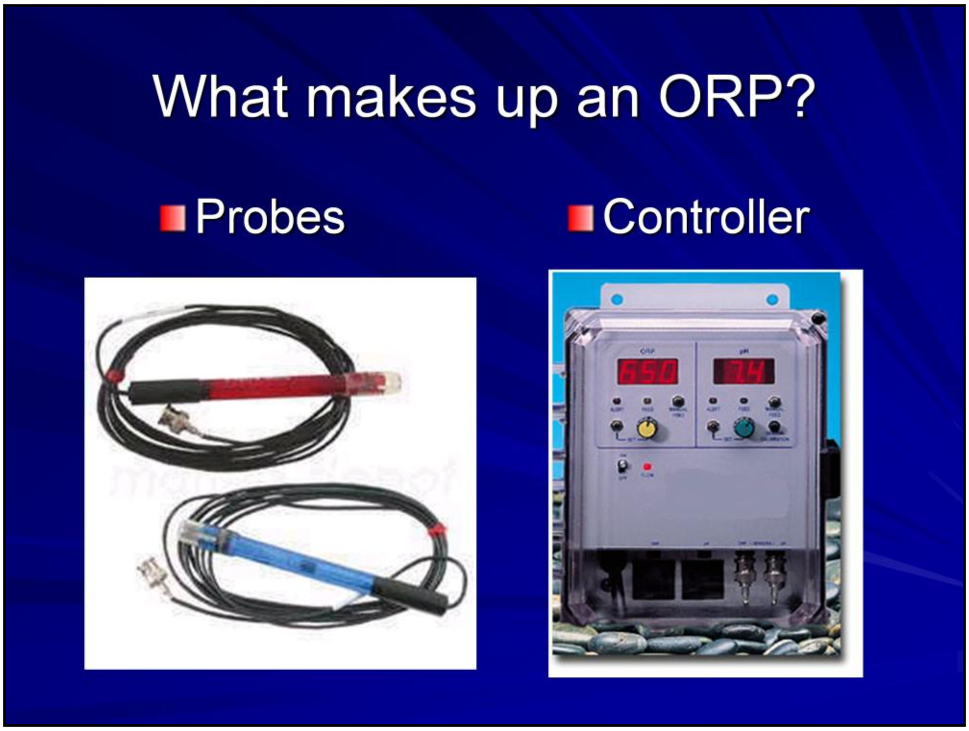
Some things you may not know about salt chlorinators and what companies will fail to tell you is the hidden cost of running the electrodes at several hundred watts continuously whenever the pool pump is on, or the cost of replacing the electrodes periodically, which should be done. Also, salt chlorinators are almost never sold with an ORP, which helps keep a handle on your levels. The salt in the water can cause corrosion of metal pool fittings, and can weaken the mortar joints of coping pavers around the rim of the pool. Also, if the pool has a tiled finish around the top edge, the salt tends to form heavy scale buildup that looks awful and is difficult to remove.

. You may think you don’t have to use sodium hypochlorite with salt chlorinators, but during periods of high bather load it may be necessary to manually supplement with sodium hypo to maintain correct chlorine levels.

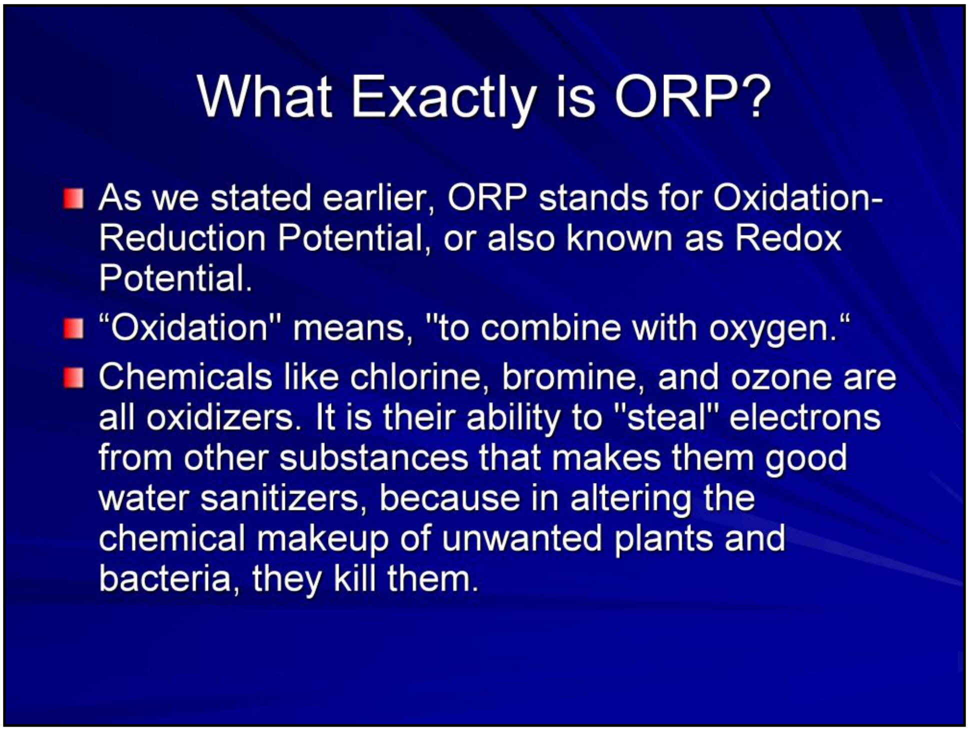
Now we will discuss ORPs and the basics of ORP controllers.



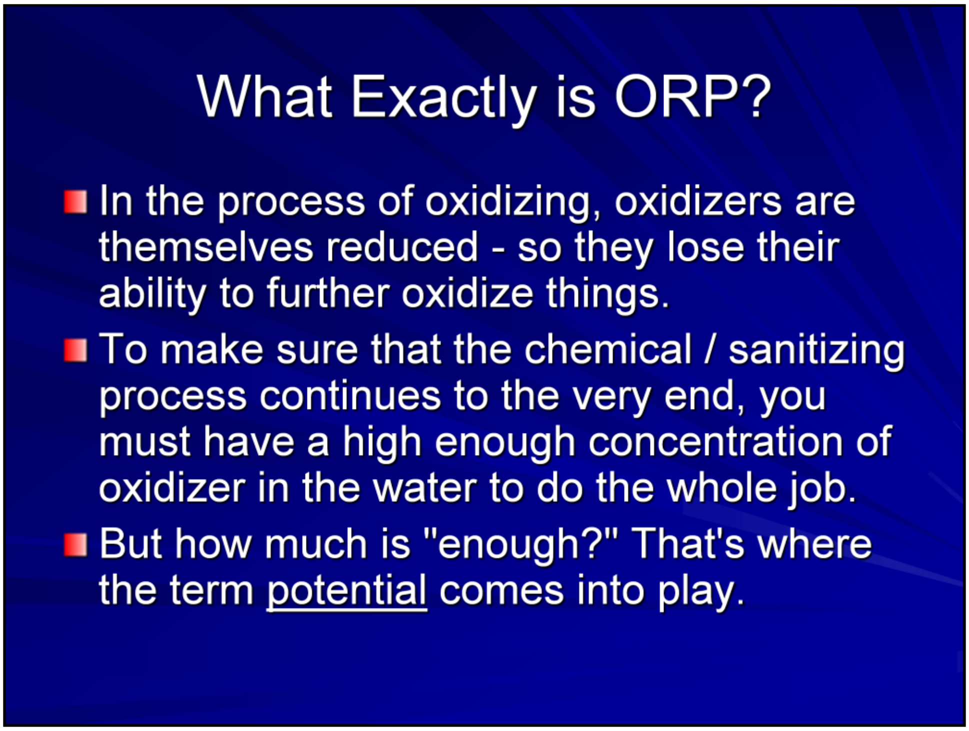
ORP stands for oxidation reduction potential, also known as redox. It is a measurement of the ability to oxidize contaminants. The ORP controller is a method used to electronically monitor the sanitizer effectiveness.



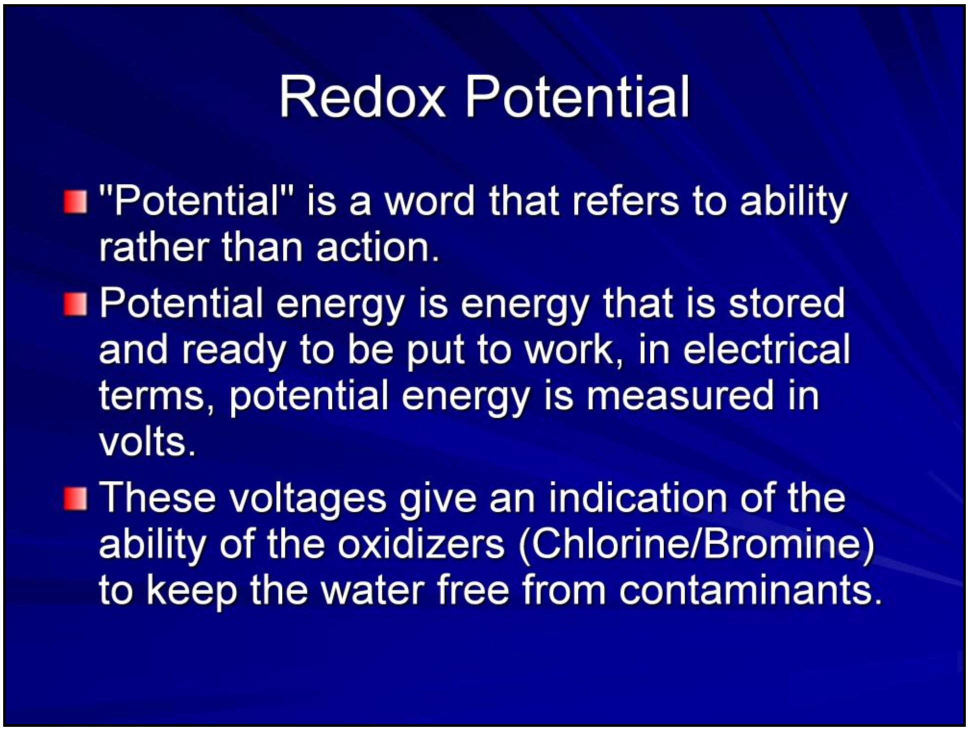
An ORP is made up of probes and a controller. The probes indicate the oxidizing/reducing capability of pool water by measuring the electron activity. The ORP probe reading signals the controller to adjust the chemical feeds as needed.



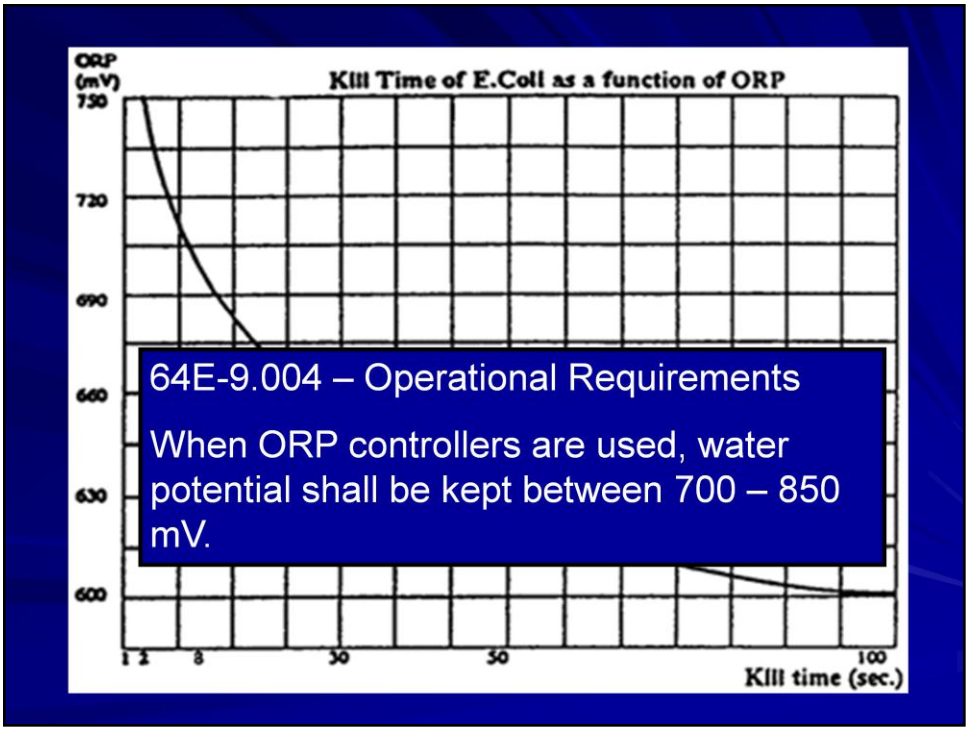
As we stated earlier, ORP stands for oxidation reduction potential, or redox potential. Oxidation means “to combine with oxygen.” Chemicals like chlorine, bromine and ozone are all oxidizers. It is their ability to steal electrons from other substances that makes them good water sanitizers, because in altering the chemical makeup of unwanted plants and bacteria they kill them.



In the process of oxidizing, oxidizers are themselves reduced, so they lose their ability to further oxidize things. To make sure that the chemical/sanitizing process continues to the very end, you must have a high enough concentration of oxidizer in the water to do the whole job. But how do you know how much is enough? That's where the term "potential" comes into play.



"Potential" is a word that refers to an ability rather than an action. Potential energy is energy that is stored and ready to work. In electrical terms, potential energy is measured in volts. These voltages give an indication of the ability of the oxidizers, like chlorine and bromine, to keep the water free from contaminants.

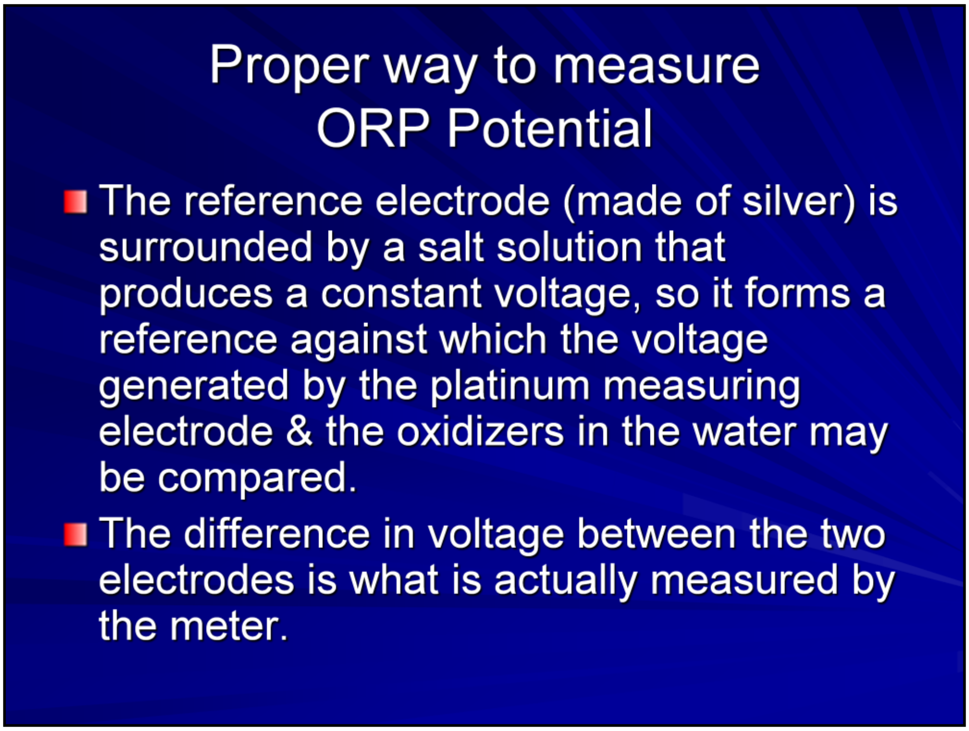


In the background is a chart that shows how many seconds it takes to kill E.coli according to how high the ORP controller is set. The higher the millivolts are the quicker the kill time will be. Under the state code for public pools, ORP controllers shall be kept between 700 and 850 millivolts.

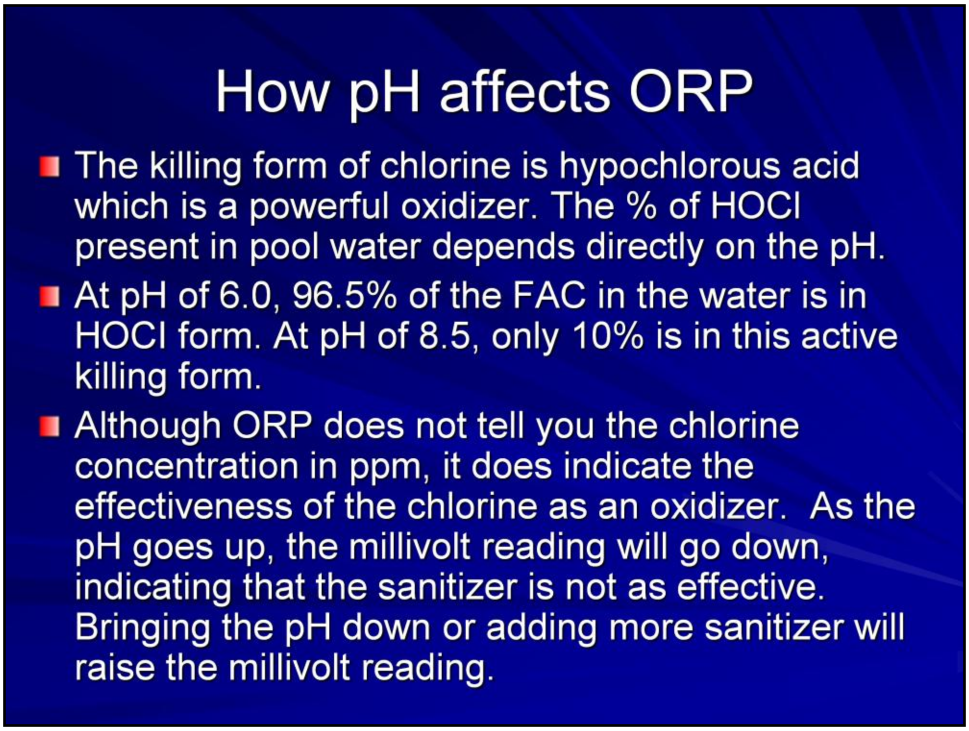
Proper way to measure ORP Potential

- An ORP probe is really a millivolt meter, measuring the voltage across a circuit formed by a reference electrode constructed of silver wire, and a measuring electrode constructed of a platinum band.

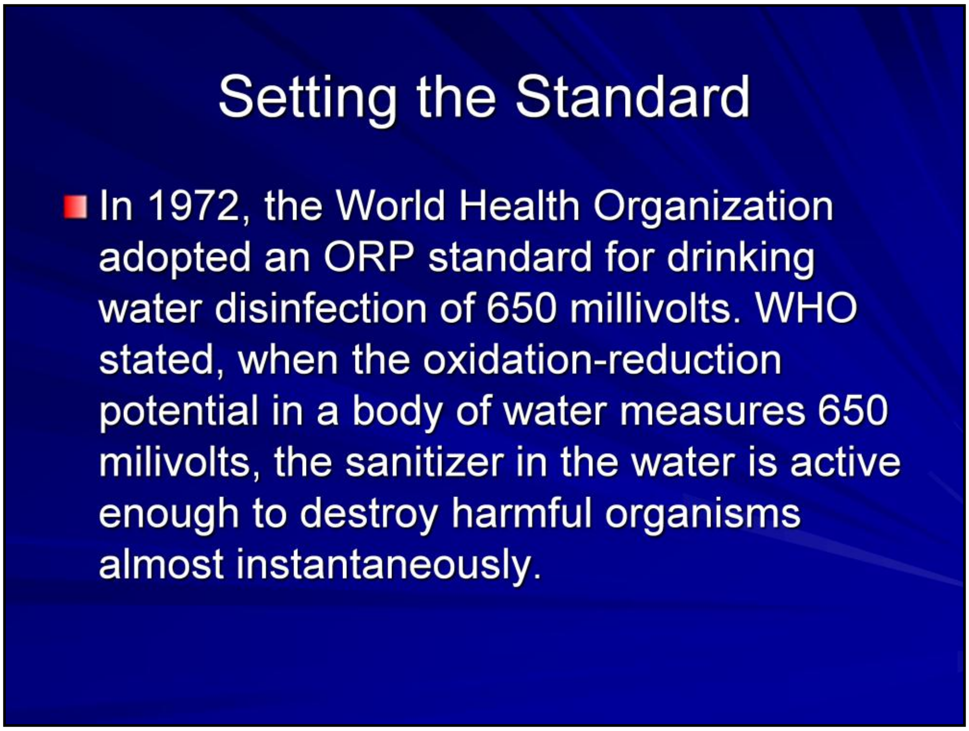
An ORP probe is a millivolt meter, measuring the voltage across a circuit formed by a reference electrode constructed of silver wire, and a measuring electrode constructed of a platinum band.



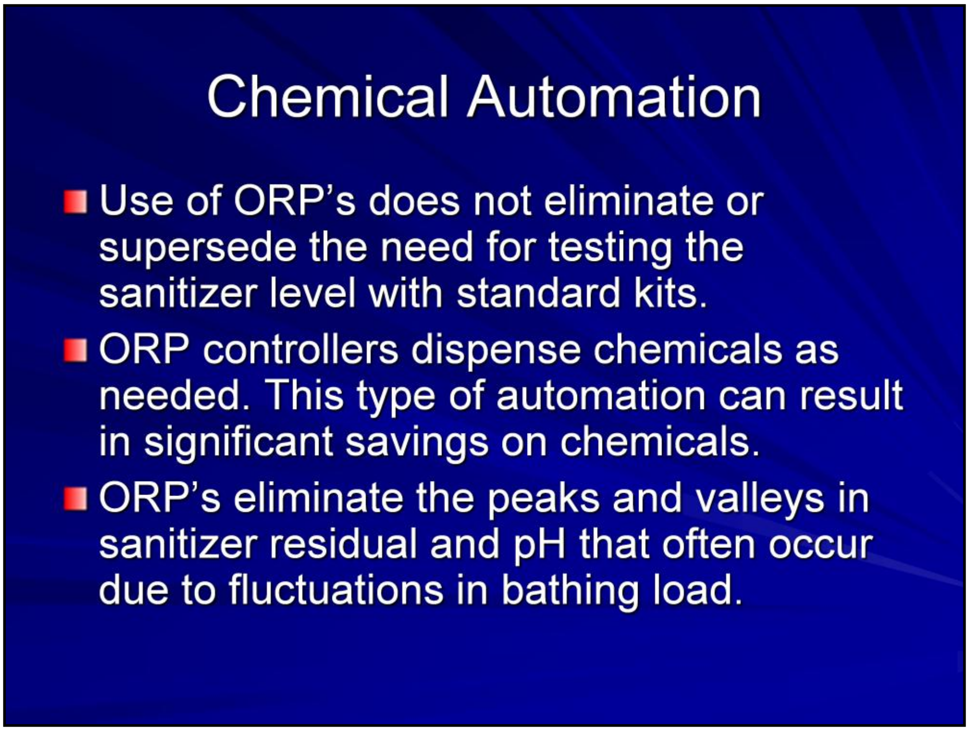
The silver reference electrode is surrounded by a salt solution that produces a constant voltage, so it forms a reference against which the voltage generated by the platinum measuring electrode and the oxidizers in the water may be compared. The difference in voltage between the two electrodes is what is actually measured by the meter.



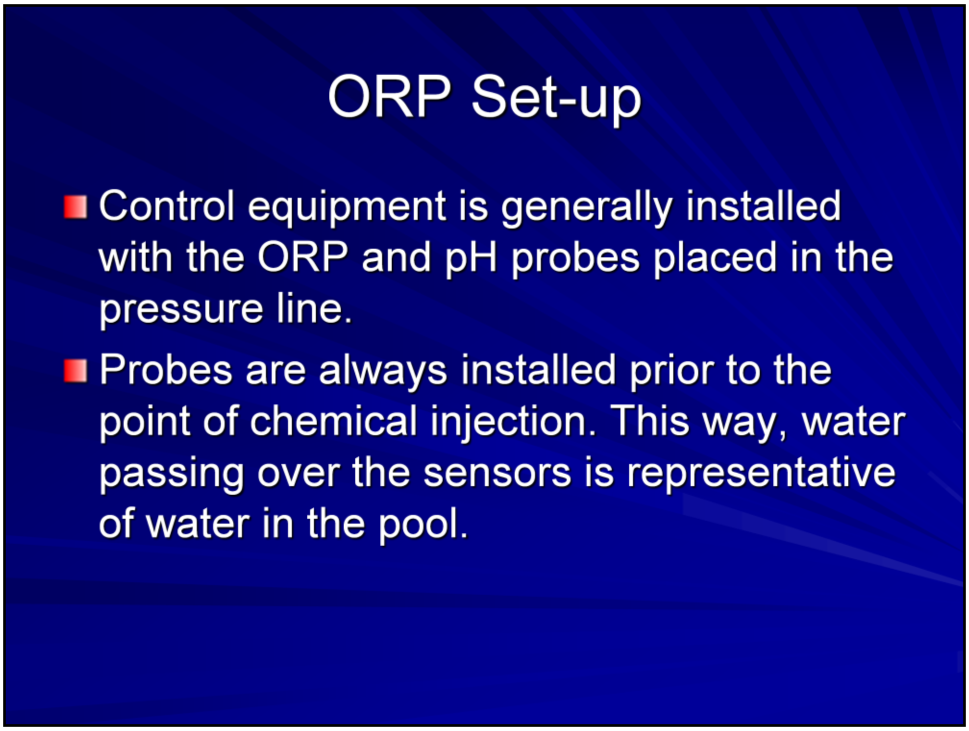
. The killing form of chlorine is hypochlorous acid which is a powerful oxidizer. The percentage of hypochlorous acid present in the pool water depends directly on the pH. At a pH of 6.0, 96.5% of the free active chlorine in the water is in hypochlorous acid form. At a pH of 8.5, only 10% is in the active killing form. Although the ORP does not tell you the chlorine concentration in parts per million, it dies indicate the effectiveness of the chlorine as an oxidizer. As the pH goes up, the millivolt reading will go down, indicating that the sanitizer is not as effective. Bringing the pH down or adding more sanitizer will raise the millivolt reading.



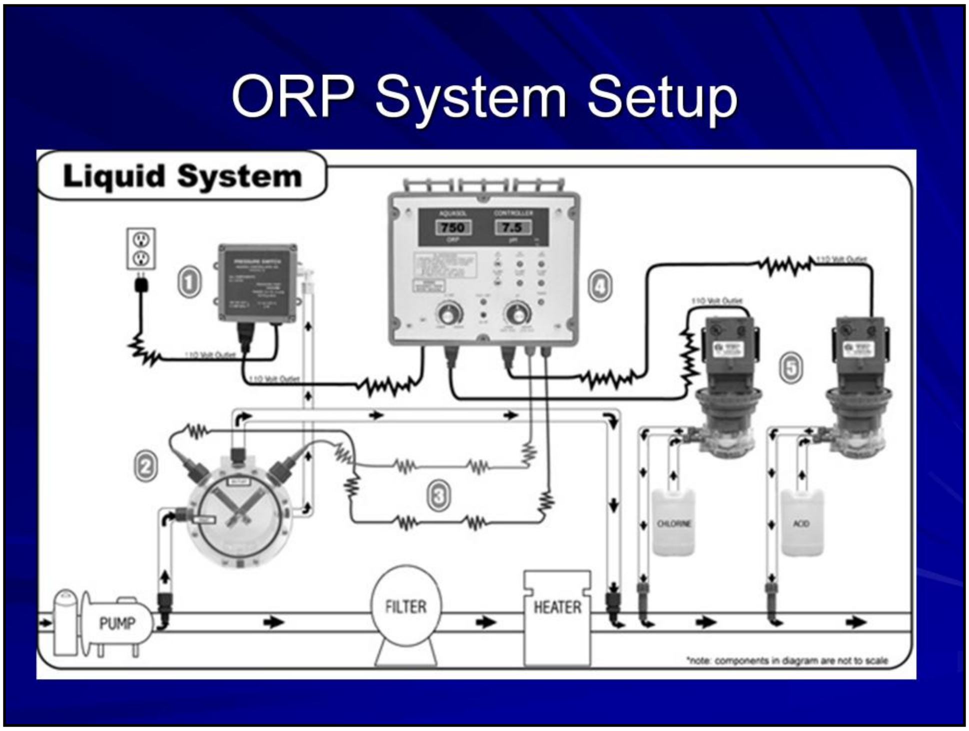
In 1972, the World Health Organization adopted an ORP standard for drinking water disinfection of 650 millivolts. WHO stated, when the oxidation reduction potential in a body of water measures 650 millivolts, the sanitizer in the water is active enough to destroy harmful organisms almost instantaneously. Remember, the pool standard is 700 to 850 millivolts.



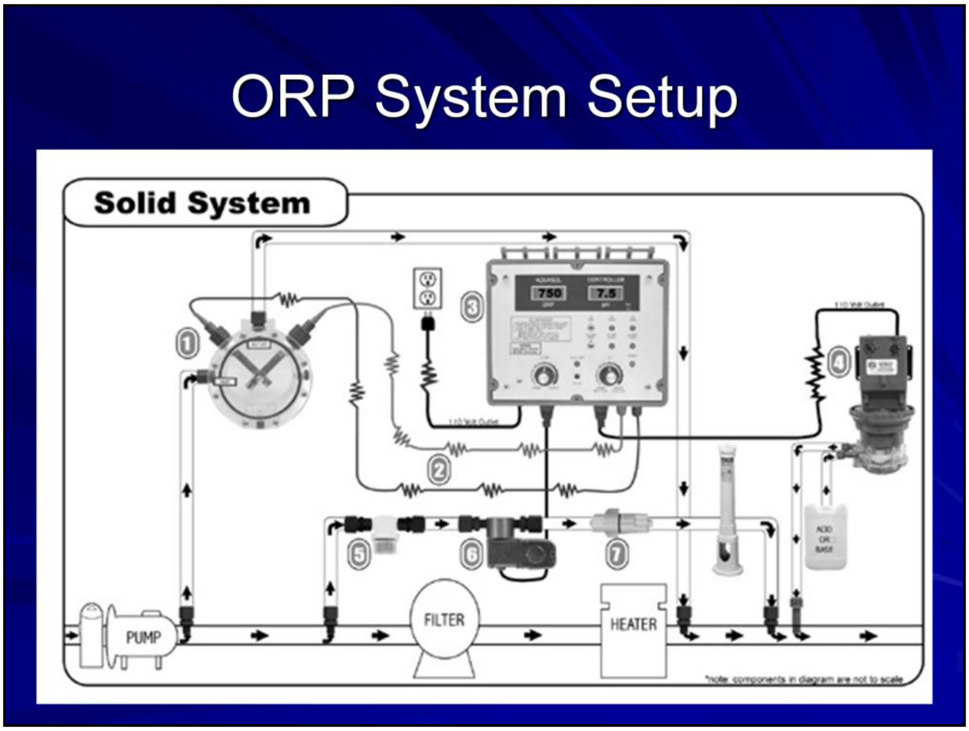
The use of an ORP controller does not eliminate or supersede the need for regular testing of the sanitizer level with a standard test kit. ORP controllers dispense chemicals as needed. This type of automation can result in significant savings on chemicals. ORPs eliminate the peaks and valleys in sanitizer residual and pH that can often occur due to fluctuations in bathing load.



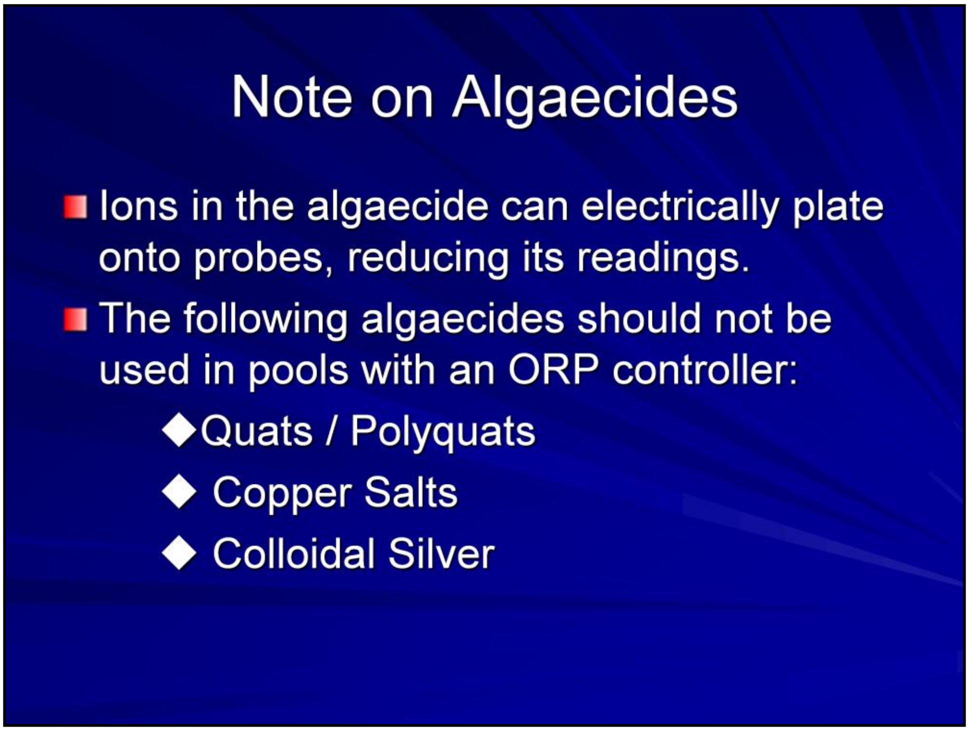
The control equipment is generally installed with the ORP and pH probes placed in the pressure line. The probes are always installed prior to the point of chemical injection. This way the water passing over the sensors is similar to the water in the pool.



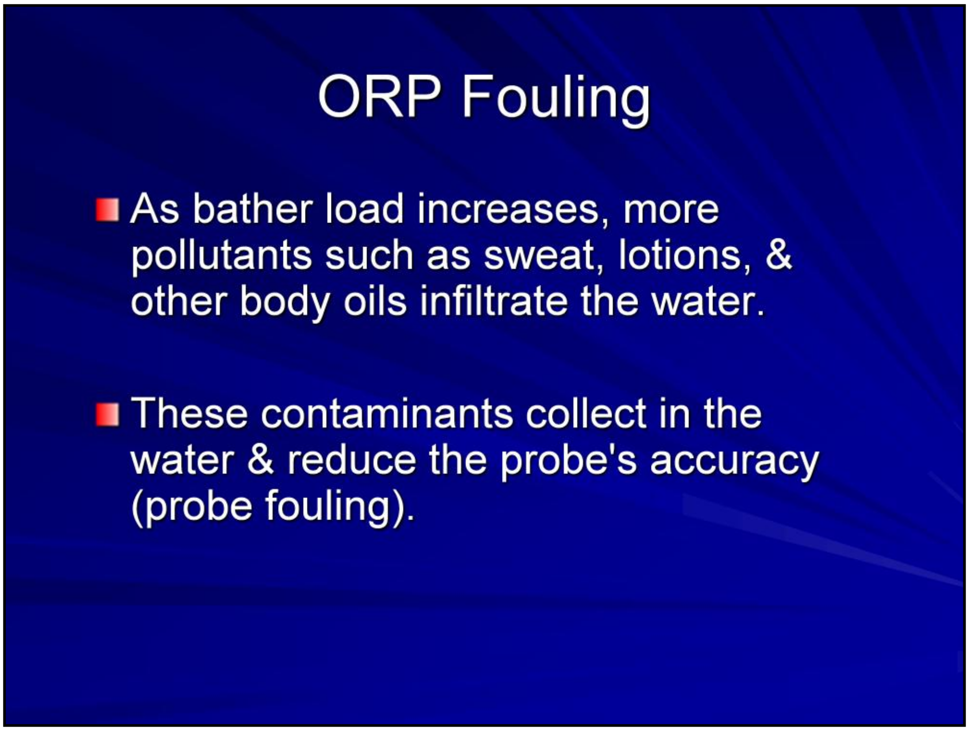
This is a diagram of an ORP system set up with liquid chemicals. Water goes into the cylinder with the probes to be read and sent to the controller, which will adjust the liquid chemicals as necessary.



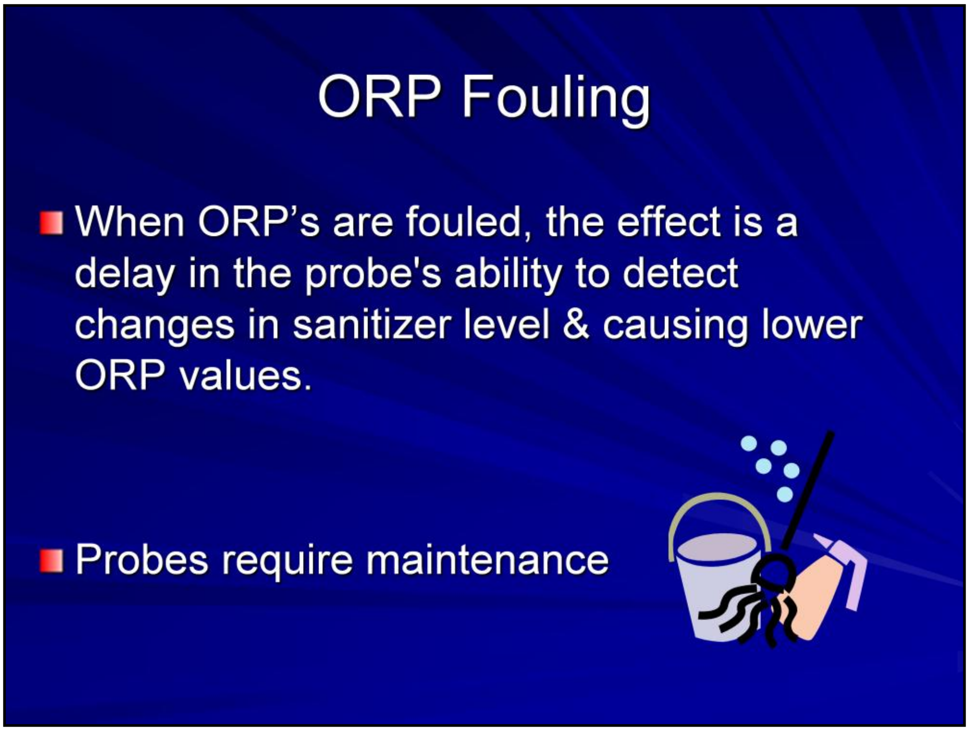
. This diagram shows an ORP system set up on a solid system, or an erosion system.



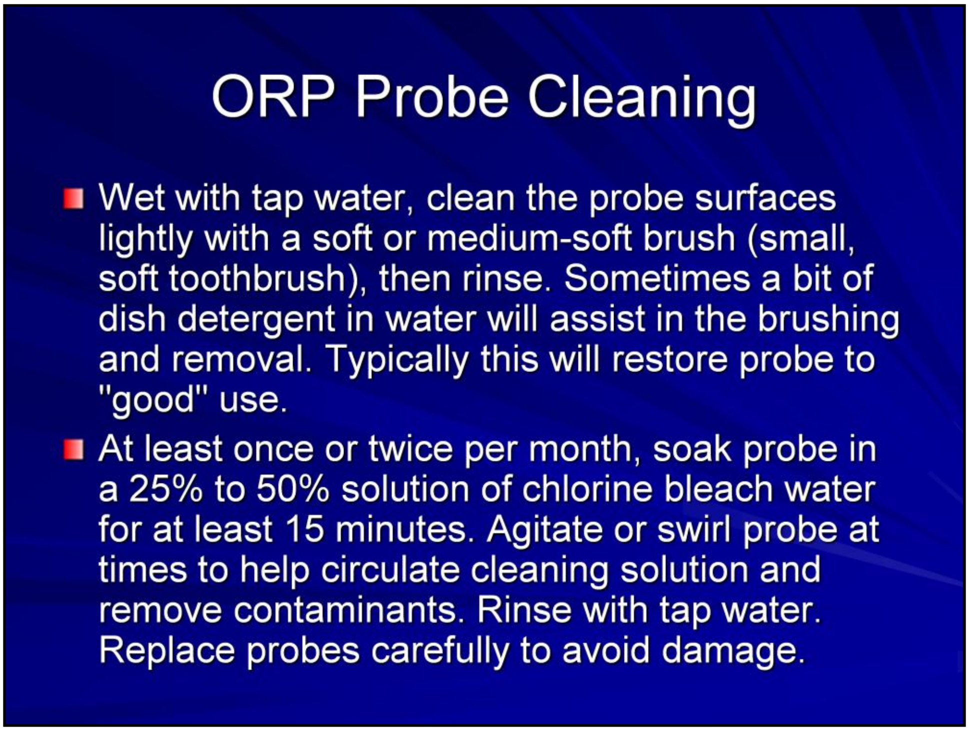
A note on algaecides, the ions in algaecides can electrically plate onto the probes, reducing their readings and effectiveness. You should not use these algaecides on any pools with ORP controllers: quats and polyquats, copper salts and colloidal silver.



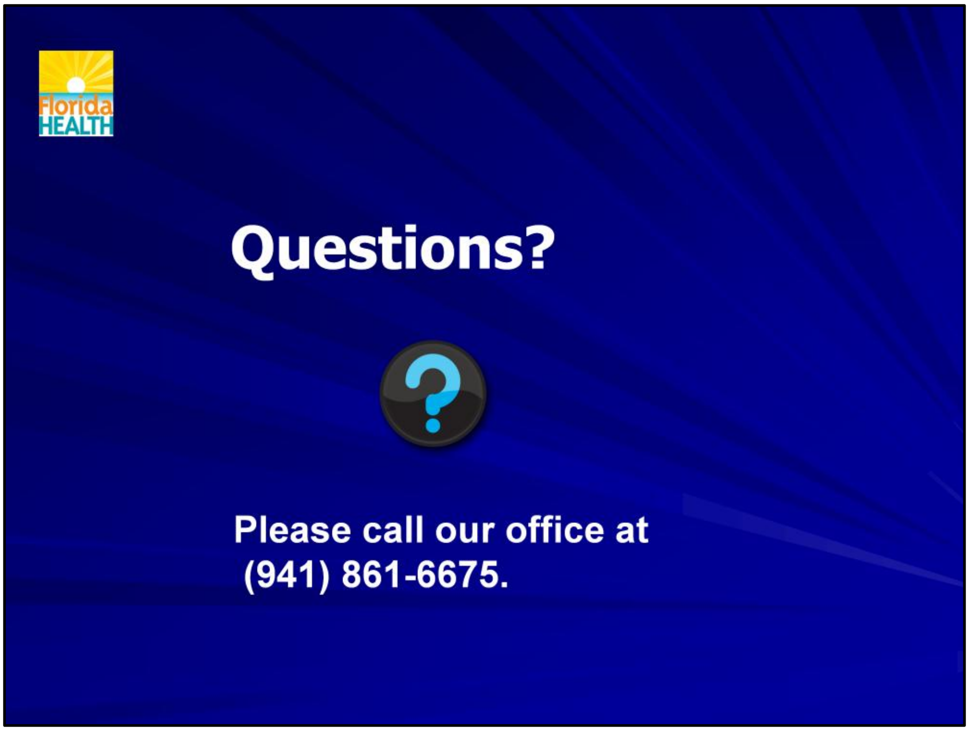
As the bather load increases, more pollutants like sweat, lotions and other body oils can infiltrate the water. These contaminants will collect in the water and reduce the probe’s accuracy, known as probe fouling.



When ORPs are fouled, they can delay the probe's ability to detect changes in the sanitizer level and can cause lower ORP values. Your ORPs require regular maintenance.



To clean the probe, wet it with tap water, clean the probe surfaces lightly with a soft or medium-soft brush, like a small soft toothbrush, then rinse it. Sometimes using a very small amount of dish detergent in the water will help with brushing and removal. This will typically restore the probes to good use. Once or twice a month you should soak the probe in a 25 to 50% solution of chlorine bleach water for at least 15 minutes. Swirl the probe around a few times to help circulate the cleaning solution and remove contaminants, and then rinse with tap water. Replace the probes carefully to avoid damaging them.



If you have any questions about anything that was discussed, please give us a call.