LOW CHLORINE LEVEL IN POOL

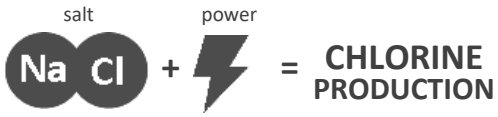
Before proceeding, it is **important** to understand when measuring pool chlorine that **you are detecting the "leftover" amount** in the water, and that measuring a lack of chlorine **does not necessarily mean that your salt system is not working.**

This guide will: **1)** help you verify with certainty whether or not your system is operational and creating chlorine, and **2)** help identify what else may contributing to the low chlorine level in the swimming pool water.

1) Verifying your system's Chlorine Generation

What is required for chlorine production:

There are only two factors required for the system to generate chlorine: salt and electricity. If there is sufficient salinity in the water and electrical power is being sent to the Electrolytic Cell, the system is generating chlorine normally. The system will detect and display errors when there is an issue with the transmission of power through the salt water. Otherwise, the system's ability to transmit power can be verified to confirm chlorine generation.



Verifying Power is present in Cell:

1. **Ensure no Warning Lights are on (inhibiting Power in the cell)**
   - Is the Water Flow LED indicator illuminated? If it is, the system is not able to send power through the cell because the Flow Sensor is not being triggered by the flow of water. See Page 11 for troubleshooting.
   - Is the Check Cell or Low Salt LED indicator illuminated? If it is, the system is not able to send power through the cell because of excess mineral build-up inside of the cell or improper salt levels. See Page 12 for troubleshooting.
   - Is the System Error LED indicator illuminated solidly? If it is, the system is detecting an ongoing issue or critical fault and has stopped sending power through the Cell. See troubleshooting beginning on Page 14.

2. **Confirming Power in the Cell (measuring cell current)**
   - If all warning lights are off, power is successfully able to pass through the cell. For further confirmation, the Control Module has a built-in power meter that verifies that the full & normal amount of power is able to pass through the cell.
   - To verify the power being sent through the cell, turn the chlorine output setting up to 100% for diagnostic purposes. To access the power reading, press and hold the BOOST button for three seconds to display the "Cell Current" reading (Water Flow LED indicator will now be ON).
     - The power graph LED lights will begin to alternate back and forth with the Power (ON/OFF) LED light.
     - Count the number of chlorine level LED's when the Power LED is on, and when the Power LED is off.
       - Example: 5 chlorine level LED's lit with the Power LED on, and 7 chlorine level LED's lit with the Power LED off = 5.7 cell amps
   - As long as you can confirm that there is a "Cell Current" reading (often 5-6 when turned up to 100%), the system is successfully able to pass power through the Cell, and is operating normally and creating chlorine.

Summary: If salt is present above the minimum level of 3000 ppm, if the no warning lights are illuminated solidly, and if "Cell Current" reads normal when the system is turned up to 100%, then the system **is fully operational and creating chlorine normally**. If a low chlorine level persists after continued operation, see the next pages to troubleshoot common causes of high chlorine demand.

2) Common Causes of Low Chlorine Levels

A) Examine the Water Chemistry

- Water chemistry and environmental conditions are the #1 cause of a low chlorine level in a saltwater pool, as they cause chlorine demand to rise above normal levels. **High chlorine demand** means that chlorine is being consumed quicker than it is being replenished, resulting in the inability to measure the chlorine residual in the water. If operation has been verified (as described on the previous page), this *does not mean* that the chlorine generator is not working, only that the chlorine demand currently exceeds the rate of chlorine production.

- The ideal levels for a salt water pool are

Free Available Chlorine	1.0 - 3.0 ppm
Salinity	3000 - 4000 ppm
pH	7.2 - 7.8 (7.5 best)
Stabilizer (Cyanuric Acid)	30 - 50 ppm
Total Alkalinity	80 - 120 ppm
Calcium Hardness	200 - 400 ppm
Saturation Index	-0.2 to +0.2 (0 best)
Phosphates	0 to 100 ppb (0 best)
Nitrates	0 to 10 ppm (0 best)
Iron	0
Copper	0
Other metals	0
Ammonia	0

The levels that are highlighted levels are the most common causes of high chlorine demand and depleted chlorine levels in pools. Ensure that all three levels are being tested for and that their values are included on your chemistry report.

The **Chlorine Stabilizer** (Cyanuric Acid, or CYA) level must be within range, especially during the spring and summer months. If there is not enough CYA in the pool, then your chlorine will not be protected from the sun and the chlorine being produced by the salt system will be consumed once the sun hits the pool water. Up to 90% of the pool's chlorine can be depleted within 2 hours without a sufficient level of chlorine stabilizer. High levels can also negatively affect chlorine levels & effectiveness.

Phosphates and **Nitrates** that are present in the pool will cause the chlorine demand to rise and/or will consume the chlorine being made by the salt system (Also see page 4). Phosphates are very common. Any Phosphate level near or above 100 parts per billion can greatly increase the chlorine demand in the pool. Any Phosphate level over 200 Part Per Billion will not only consume your chlorine, it will also readily feed algae. To remove phosphates, use commercial grade Phosfree. When trying to lower significant phosphate levels, phosphate products meant for weekly maintenance are usually not effective Nitrates will also rapidly consume your chlorine. If the Nitrate level is high, it is often most effective to drain the pool and refill with new water, being sure to add the necessary amount of salt back to the pool.

Lower salt levels can affect chlorine generation and cause the system to work inefficiently.

Other chemistry imbalances and the presence of metals, ammonia, and other impurities can cause high chlorine demand.

2) Common Causes of Low Chlorine Levels (continued)

B) Ensure that system is being given sufficient chance to generate chlorine

- **Output Level** - The percentage output level that you set tells the system how much of its maximum capacity to use in order to create chlorine. If you are experiencing high chlorine demand, ensure that you have your system turned up to 100% output so that it is doing as much as possible to compensate. Leave the system at 100% output until the pool is balanced again. Since every pool operates differently and has a different level of chlorine demand, during normal operation there is not a standard percentage level at which to set the output.
- **Run time** - When sized right, a chlorine generator can typically achieve sufficient chlorination when run on the filter pump's normal schedule. However, every pool has different equipment and its operation is unique, and you may require (or choose) to run the filter pump more or less than is standard. As a rule of thumb however, run your system one hour for every ten degrees of ambient temperature in order to achieve both sufficient filtration and chlorination. Periods of high use, harsh environmental conditions, or excessive chlorine demand may require extended run times. For example, running your system twice as long will allow it to create twice as much chlorine.
- **Double check power** - Is the salt system turning on and off with the pump as normal? Has the fuse, fuse reset button, or circuit breaker been tripped?

C) Other common high-chlorine demand situations

- **During initial startup** (springtime / new pools) - When being opened, pools typically have much higher than normal chlorine demand. In these circumstances a pool requires a large amount of sanitizer all at once, which means that it is often more effective to add chlorine or shock as needed initially instead of waiting on the system to slowly reach "break-point" chlorination.
- **When organic matter is visible in the water** -
- **After rain storms** – Rain water can dilute pool sanitizer levels and negatively affect the water chemistry balance. Water runoff can introduce impurities, organic matter, and microorganisms into the pool.
- **After heavy pool usage** – Swimmers introduce organic matter that needs to be oxidized (sweat, lotions, oils, waste, etc…). Foot traffic in and out of the pool can introduce impurities, organic matter, and microorganisms into the pool. A high number of swimmers can quickly deplete sanitizer levels and cause chlorine demand to spike.
- **After young swimmers have used the pool** – A young swimmer or swimmers may introduce high levels of organic matter.
- **After nearby lawns and gardens have been fertilized** – Local fertilization can introduce nutrients into the pool water that allow microorganisms to thrive and multiply faster than pool sanitization is able to prevent. Fertilizer can reach the pool through rainwater runoff, wind, or even directly into the pool by being applied too nearby.
- **After pets or other animals have been in the pool** – Animals can introduce dirt, organic matter, and microorganisms.
- **After strong winds or dust storms** – Windy conditions can introduce dirt, organic matter, and fertilizer (even from miles away)
- **During prolonged periods of high temperatures** – High water temperatures require significantly higher amounts of sanitization.

When the pool filter needs cleaning - A full dirty filter could possible contain a large amount of organic matter.