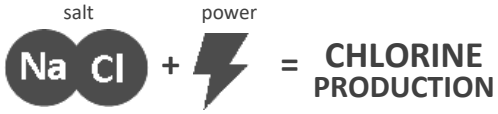
Before proceeding, it is **important** to understand when measuring pool chlorine that **you are detecting the "leftover" amount** in the water, and that measuring a lack of chlorine **does not necessarily mean that your salt system is not working.**

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. **Ensuring Full and Normal Power in the Cell**
   - Turn unit off with main power switch on lower right, then turn unit back on.
   - Use "+" to turn raise the output to 100%. Wait 1-2 minutes. The system has built-in diagnostics to verify that the full and normal amount of power is passing through the cell; you will see the output lights blink as it attempts to reach the chosen output level.
   - Do all four "O**utput**" led lights ultimately illuminate and remain solid green? If yes, the system is detecting & confirming that it is successfully able to send constant power to the Cell.
   - Do all warning led lights remain inactive (dark)? If yes, there are no detected issues with power flow to the Cell.

2. **If you answered "Yes" to all of these questions, you have successfully verified full and normal power**. This means:

3. **The system is fully operational and creating chlorine normally.** Salt present in the water at proper levels and proper power flowing through the Cell causes full & normal chlorine generation.
   - If a low chlorine level persists after continued operation, this indicates an issue in the water causing "high chlorine demand". **See the next pages** to troubleshoot common causes of high chlorine demand.

4. If you answered "No" to any of these questions, then there is an issue preventing proper flow of power to the Cell, which needs to be addressed. See Troubleshooting Quick Reference at end of this guide.
   - Please note that if your "Cell Life Low" LED is lit, this DOES NOT impact chlorine generation. Your system has tracked the hours of use your cell has experienced and your cell is likely in the later stages of its lifespan. This is simply a reminder that you should plan for eventual cell replacement.

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.

Quick Reference

See previous sections for more detailed explanations to common scenarios, diagnostic readings, and warning lights.

SCENARIO:	POSSIBLE CAUSE:	SUGGESTED ACTION:
Low or no chlorine residual in pool	Insufficient Chlorine Output Level	Increase Output Level. This is often required seasonally with increasing temperatures.
(Also cloudy water, green pool)	Insufficient run time	Increase run time to at least 1 hour per 10° ambient temp. Ensure 1.5-2x filter turnover.
	Heavy pool use, inclement weather, organic matter	Activate Super CL mode or chemically shock pool.
	Water chemistry issues, such as: Low Chlorine Stabilizer Low salt in pool Phosphates in pool Nitrates in pool	Contact pool professional, ensure all chemicals on page 8 are within range.
	Cell is dirty, clogged, or has excessive scaling or mineral build-up	Remove Cell from plumbing, inspect and clean (see page 11).
	Inactive unit, flow switch not triggered	Inspect Flow Switch, verify sufficient water flow
	Inactive unit, power is off	Turn on system, or see “No Power”
Low or no Chlorine residual in pool after recent installation	Water chemistry was not balanced prior to system installation and a high chlorine demand persists	Contact pool professional, ensure all chemicals on p.6 are within range, chemically shock pool if necessary. Run system at maximum output.
	System hasn’t been running	Double check all connections, verify system runs in sync with circulation pump.
No Power	System is turned off	Turn system on, verify circulation pump is active
	Problem with input power, voltage, or configuration of system wiring	Have a professional test input power & ensure correct wiring configuration & connections.
	Reset has tripped	Allow one hour to cool.
	Other malfunction in unit	Contact customer support
Chlorine Output LED blinking	The level has been increased/decreased	This is normal after pressing +/-, or during low temperature
Clean Cell LED is on (Has priority over salinity LED indicators)	It is time to clean the Electrolytic Cell.	The Cell must be cleaned (see page 11 for instructions).
	Salinity is out of range	Verify salinity (see pages 6-7).
	Cell efficiency has been greatly reduced	Inadequate water flow exists, or Cell must be replaced.
Low Salt LED is on	Salinity is out of range	Manually verify salinity (see pages 6-7).
	Cell is dirty or clogged	Inspect and clean Cell if necessary.

WARNING – Always make sure the input power is completely disconnected before attempting any troubleshooting procedures.
All troubleshooting should be done by a qualified professional.

No Flow LED is on	Insufficient water flow or air bubbles	This may happen temporarily if there is air in the lines at initial startup. Check water level, pump cavitation, air or blockages in plumbing, and all valves & seals. Clean filters & strainers.
	Obstruction or build up on or around flow switch paddle	Dismantle Cell and remove debris to ensure flow switch paddle moves freely.
Water leak	O-Ring improperly seated	Ensure O-Rings are clean and in good condition.
	Threaded collars are cross-threaded or pipes are misaligned	Inspect threads for damage, ensure that each screws back on without resistance.
Cell frequently has mineral buildup	This is due to imbalanced water chemistry and a high Saturation Index	Ensure that your Saturation Index is at or near zero, in order to avoid damage or premature cell failure. (page 8)
Cell never or rarely has mineral buildup	Water may be corrosive due to imbalanced water chemistry and a low Saturation Index	Ensure that your Saturation Index is at or near zero, in order to avoid damage or premature cell failure. (page 8)
Cold Water LED is on	Winter Mode is activated	Water temp is less than 64°. No further action req.
Chlorine Output level does not reach 100%	Cell is dirty or clogged	Clean Cell (see page 11).
	Damaged Cell or Cell cable	Contact Customer Support.
Cell Life Low LED is on	If salinity is within range, system has reached the end of its lifespan, cell blades are worn.	Cell is reaching its working capacity limit. Cell must be replaced once "Cell Life Low" LED is on and Chlorine Output setting won't reach 100%. Replacement cells are readily available for purchase from your local dealer or at www.circupool.com
System Error LED is blinking	Debris is stuck in the electrical connection between Cell and Control Module	Remove Control Module from the Cell. Clean the electrical connection from any debris stuck in it. Wipe with a dry cloth.
	Other communication problem between Cell and Control Module	Contact Customer Support
System Error LED is on	Debris is stuck in the electrical connection between Cell and Control Module	Remove Control Module from the Cell. Clean the electrical connection from any debris stuck in it. Wipe with a dry cloth.
	Cell blades are dirty or worn	Inspect Cell for debris or scaling, clean if necessary. Replace Cell if damaged or worn.
	A more serious error has occurred	Contact Customer Support.
All LED lights flashing	Salt level may be greatly out of range	Manually verify salinity (see pages 6-7).

For more information or troubleshooting, visit www.circupool.com/help

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