CSS5-1 Salt Chlorine Generator-Ozonator for Spas

Note: These units are designed barely emit chlorine so it doesn't show up that well on test strips or even on a pool & spa store test. It only produces what the water needs & won't overproduce. If the customer wants higher levels of chlorine, which they don't need because it will smell & burn their eyes, then they can double up the salt in the spa. As long as the blue light emits from the ozone itself & there are bubbles in the salt generator then the unit is working even though they can't get a reading.

1.0 PREPARING YOUR SPA: Draining and refilling of the spa is recommended, but not required (required if bromine or Baquaspa was used previously). In any case, water should be balanced as follows:

pH	7.2 to 7.6
Alkalinity	80-120 ppm
TDS	Less than 2,000 including Salt
Salt Levels	1,500 to 3,500 ppm
Calcium Hardness	0 to 300 ppm CSS-5-1
Calcium Hardness	300 ppm and up CSS-5-2

2.0 ADDING SALT: Use pool grade salt and add to the spa water by:

2.1 OPTION 1: Adding salt to a bucket or pitcher. Ensure it is mixed and then pour mix into spa, distributing it evenly, away from skimmers. Repeat as necessary to dissolve all salt.

2.2 OPTION 2: Adding salt directly to spa, away from skimmers. Pour evenly around spa.

2.3 In either case, add salt when water is heated (95 deg or higher) to ensure it dissolves fully.

2.4 Use the chart below to determine the amount of salt which must be added to the spa. The highlighted bands indicate the normal range of salt concentration required. It is recommended that 2,600 ppm be used as a starting point.

Start-Up Salt Poundage Required (0 ppm Start)					
Spa Size –Gallons					
Salt (ppm)	**200**	**300**	**400**	**450**	**600**
1,600	2.7	4.0	5.3	6.0	8.0
1,800	3.0	4.5	6.0	6.8	9.0
2,000	3.3	5.0	6.7	7.5	10.0
2,200	3.7	5.5	7.3	8.3	11.0
2,400	4.0	6.0	8.0	9.0	12.0
2,600	4.3	6.5	8.7	9.8	13.0
2,800	4.7	7.0	9.3	10.5	14.0
3,000	5.0	7.5	10.0	11.3	15.0
3,200	5.3	8.0	10.7	12.0	16.0

3,400	5.7	8.5	11.3	12.8	17.0
3,600	6.0	9.0	12.0	13.5	18.0
3,800	6.3	9.5	12.7	14.3	19.0
4,000	6.7	10.0	13.4	15.0	20.0

3.0 START-UP: After salt has been added to the spa, it is recommended that the system be run for 48 hours to ensure an adequate amount of chlorine is generated.

3.1 For outdoor spas, the addition of cyanuric acid will help stabilize the chlorine level as chlorine is volatile and will evaporate out of the water over time.

3.2 Verify the ozonators is working by checking for a blue glow around the top and/or bottom of the gaskets between the end plates and body of the unit.

3.3 Monitor the filter during initial start-up. Depending on water quality, the ozonation process may generate considerable amounts of precipitants which must be removed by filtration.

3.4 After the 48 hour start-up period backwash or clean filter and perform a cell cleaning (see below).

4.0 NORMAL OPERATION: The system generates chlorine and ozone when the pump is running in the low circulation setting.

4.1 Chlorine levels may be adjusted by increasing or decreasing the salt level in the spa.

4.2 The minimum recommended run time to generate adequate amounts of chlorine is 4 to 6 hours per day. The system does not produce ozone or chlorine unless the system is running in the low cycle.

4.3 Salt chlorine generators may naturally increase the pH of the spa. Monitor pH regularly and adjust if it is not between 7.2 and 7.6.

NOTE: The pH is the most important factor for ensuring maximum chlorine production. As pH increases above 7.6 chlorine production will decrease rapidly. Optimum pH is 7.2.

4.4 Water with high calcium levels will result in scaling of the cell (high pH will make the problem worse). Use muriatic acid to clean regularly (every four weeks should work in most cases, see procedure below).

4.5 Shocking may be required periodically.

NOTE: The system only produces chlorine and ozone when the circulation system is running.

5.0 CLEANING THE CELL: Calcium build-up can occur on the edges of the salt generation plates. This is normal as long as it is not sufficient to block flow. If it appears that calcium build-up will affect the flow pattern, then the cell can be cleaned as follows:

5.1 Detach ozone feed line to injector from the check valve outlet.
5.2 Insert this end into a small bottle (4-6 oz) of muriatic acid while spa is operating.
5.3 Allow suction to draw acid into cell and shut-off circulation.
5.4 Turn off circulation, let system sit for 5-10 minutes.
5.5 Reconnect ozone tube line.
5.6 Restart system.
5.7 Alternately, cell can be removed and dropped into a container of muriatic acid.

System Operation

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1.0 SYSTEM COMPONENTS: The CSS system consists of three major components:

1.1 Ozone Generator: This portion of the system generates ozone, which acts as the primary oxidant in the water treatment process (see below). Ozone is generated with a specialized high intensity ultraviolet lamp.

1.2 Salt Chlorine Generator: Chlorine is generated when the chlorine in dissolved salt is converted to a form which is useful as a disinfectant (see below). The chlorine generator consists of a power supply housed in the main body of the unit and an electrolytic cell through which water from the circulation system passes.

1.3 Venturi Injector: The venturi creates suction when water flows through it drawing ozone in to the water. The venturi is placed before the electrolytic cell.

2.0 WATER TREATMENT PROCESS: Water treatment is accomplished by two processes: oxidation and disinfection.

2.1 Oxidation: Oxidation is a process by which chlorine or ozone react with contaminants in the spa (referred to as bather loading). Bather loading consists of sweat, mucus, oils, urine, cosmetics and other contaminants shed by spa users. They worsen water quality and provide an environment which promotes the growth of microorganisms.

In a chlorine only spa, this reaction creates combined chlorines, which are the source of odors and irritation. Combined chlorines are normally removed by a process called breakpoint chlorination. Upwards of 90 percent of chlorine can be consumed in oxidation reactions.

Ozone, which is the most powerful oxidant available, replaces chlorine as the primary oxidant in the spa. Ozone reacts with bather loading and precipitates it so that it can be removed by filtration.

2.2 Disinfection: Disinfection is the process by which microorganisms are killed. Although most people associate water treatment with disinfection, it actually consumes relatively little chlorine.

2.3 Water Treatment: Water treatment equals oxidation plus disinfection. The CSS

unit provides both functions: ozone for oxidation and chlorine for disinfection. The system is designed so that ozone does most of the work in the water treatment process. The chlorination level is set so that only enough of a residual is produced to kill remaining microorganisms. The amount of chlorine required for this process is very low.

3.0 TROUBLESHOOTING: The most common problems are covered below. If you have a problem which is not listed, contact Prozone.

3.1 Water Turns Cloudy or Foams: Even clear water from a good municipal source can contain dissolved solids, oils or other contaminants which will be precipitated by ozone. This process can happen immediately or take several days. When water clouds or foams, it means that the ozone is reacting and removing contaminants from the water.

Correction: Once the ozone precipitates contaminants, they must be removed by filtration. Cloudiness is a sign that the filter needs to be cleaned and checked for integrity. Wash the filter or replace as necessary. This process may require repeating several times to allow for all the contaminants to be filtered.

3.2 Little or No Chlorine Residual: The CSS system is designed to produce a low level of chlorine that ensures the spa has adequate disinfection. This quantity of

chlorine can be as much as 90 percent less than what is required in a chlorine only spa.

Normal test kits measure chlorine residual (combined chlorine which is chlorine combined with bather load). Since ozone will normally keep bather load at very low levels, combined chlorines will be at very low levels, making detection difficult.

In outdoor spas, chlorine will dissipate faster when the water is exposed to sunlight. The addition of cyanuric acid may be required to stabilize the system.

Circulation run time is another factor that affects chlorine production. Ozone and chlorine are only produced when the spa is running on low speed. The minimum recommended run time to get best results is 4 to 6 hours per day.

In areas with high calcium levels, the plates may begin to clog up as calcium collects in the chlorine generation cell. This may disrupt water flow through the plates and reduce chlorine output.

Corrections:

1. Ensure the system is running 4-6 hours per day.
2. Add cyanuric acid (outdoor spas only).
3. Shocking may be required after heavy use of the spa to allow the system to catch back up.
4. Clean chlorine cell as described above.

4.0 OZONE LIGHT NOT VISIBLE: A blue line of light should be visible at the top and/or bottom of the unit through the gasket between endplates and the main body of the unit. The light can be difficult to see, particularly in bright sunlight.

Correction: View unit in low light conditions. If a blue glow is still not visible, the unit needs to be replaced.

5.0 TROUBLESHOOTING: Contact Prozone Water Products if you have any problems you cannot resolve with the salt chlorine-ozone generator at 1-800-632-6462 (Outside of AL) and (256) 539-4570

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