

Joe Brown Park Pool Renovation

Pool specifications

Pool capacity	133,500 gallons
Flow rate	371 gpm
Total filter area	2,827 square feet
Filtration rate per square foot of filter area	13 gpm

Salt Water Chlorination (also referred to as Salt Water Generation)

Over recent years Salt Water Chlorination (SWC) has gained favour as a safe, reliable and economic method of disinfection. It is well suited to the treatment of swimming pools. While the capital cost may be a consideration, the significantly lower operating cost and high level of safety means salt water chlorinator is appropriate in many instances.

Traditionally the preferred method of disinfection of swimming pools was chlorine in liquid or tablet form. Although this method is very effective, the risk of transporting and handling such a dangerous chemical has meant many chlorine-dosing systems were phased out in favour of alternate systems such as Salt Water Chlorinators. Saltwater chlorination is a process of sanitising water, using chlorine that is produced in the pool water from ordinary salt. Developed in Australia over 30 years ago, the technology is utilised in over 90% of all residential pools in Australia today.

The process occurs via electrolysis, using ordinary salt and a device called a saltwater chlorinator - also referred to as a chlorine generator, salt chlorine generator, or salt chlorinator. Initially, a certain amount of salt is added to the water. As water passes over the chlorinator's specially coated plates, an electric current breaks down the salt and water into their basic elements to form sodium hypochlorite, which is the active sanitizer in all forms of chlorine. The chlorine kills algae and bacteria in the water and oxidizes the waste. Thereafter, the chlorine regenerates itself back to salt and begins the process over again in a virtually unending cycle. Since salt does not evaporate, an occasional addition of salt is needed only to replace what is lost due to the splash out, pumping out, draining or backwashing.¹

¹ Taras Didenko, © Australian Innovative Systems Pty Ltd

pH Control

Muriatic acid and carbon dioxide (CO₂) are the two most common products used to reduce or lower the pH of pool and spa water. CO₂ may be considered the chemical of choice.

CO₂ is considered to be easy to use — very safe to handle and store. Its use alone makes it virtually impossible to lower the pH of pool and spa water below 6.0. Extreme caution must be used to ensure safe handling and storage when using acid. Telltale signs of pool and spa facilities that employ acid as the method of pH adjustment are:

- Roughening or eating away of pool/spa finish surfaces
- Corroding/leaking plumbing
- Shortened life for recirculation pumps
- Shortened life of filter systems
- Shortened life of heat exchangers
- Corroding electrical devices, conduit, and mechanical room structural supports
- Etching and destruction of equipment room concrete floors.

CO₂ is normally delivered to a facility in bulk form. However, if acid is employed, acid fumes and vapors are ever present and the potential for spillage exists. For prudent, safe storage practice, double containment of acid storage tanks is a must, and in many states is mandatory. The potential reaction of chlorine with acid will create a lethal gas.

Precise control of pH is a necessary element in the disinfection of swimming pool and spa water, as it maximizes the potential for oxidation of organic matter. Also, precise pH balance, within proper ranges, will maximize the life of the pool and spa structure and the components of the recirculation system.²

Satellite Web Based Controllers

Controllers constantly monitor and clearly display balance levels on-site. They work together with remote monitoring systems to allow for careful maintenance of the pool's water chemistry balance.

When connected with an on-site controller, remote monitoring ensures that system imbalances are known and addressed immediately, before they can cause damage to the pool facility. This also eliminates the cost of having to bring in chemicals to rebalance the system.

² Innovative Pool Solutions website, San Antonio, TX

Rapid notification also can prevent downtime for your pool facility, which equates to happier customers and less headaches for you and your staff.

A general facilities maintenance manager may know pool-care basics but most likely does not know how to deal with more complicated pool management issues. These can be related specifically to how to make a facility cost-effective, not only based on chemical usage but also when dealing with maintenance and repair.

Often managers are asked to care for the pool themselves or hire staff to do so. In either case, training in pool care is not their job priority, and turnover is high. When hiring outside commercial pool professionals, you know that their job it is to stay up-to-date on technologies, regulations, water management and how to maintain the pool with utmost cost-efficiency. They also will be certified per specific state regulations.

When there is a problem, your remote monitoring system alerts the certified pool specialist directly on a computerized system or a cell phone, allowing an expert to immediately review the data and effectively analyze the steps that need to be taken. This takes the responsibility to diagnose and deal with the problem off of your facilities manager, reducing the manager's time and expertise needed to solve the problem. Addressing a problem immediately can significantly cut downtime or prevent closure of a facility, which in turn means greater revenue, happier guests, increased customer retention, and fewer headaches for the facility staff.

Outsourcing to a company specifically trained in commercial pool care and maintenance allows facility managers to do what they are trained to do: put their energies and focus on providing a quality guest experience and running the business in order to maximize profits and retain and add to your guest base.³

Economics

Installation costs

- A traditional chlorinating system using chlorine tablets or liquid chlorine and an acid feed pump can be installed for about \$12,500.⁴ The estimated cost of the chlorine for one year is \$8,750.⁵ Other sources estimate the cost of chlorine at \$10,000-\$15,000 annually. The cost of chlorine will rise as fuel costs rise and could be as much as \$20,000 annually.⁶

³ Susan Shelor, Using Total Water Management-Aquatics, recmanagement.com

⁴ Artie Cross, A. Cross Pools

⁵ Ronnie Strassell, Elmwood Fitness Center for 3 pools totalling 139,000 gallons

⁶ Brad Croft, President, Innovative Pool Solutions, Inc.

- A traditional chlorinating system using chlorine tablets or liquid chlorine and a CO2 controller can be installed for about \$15,000.⁷ The estimated cost of the chlorine for one year is \$8,750.⁸ Other sources estimate the cost of chlorine at \$10,000-\$15,000 annually. The cost of chlorine will rise as fuel costs rise and could be as much as \$20,000 annually.⁹
- A salt water chlorinating system with Co2 pH controller and a satellite web based controller with digital flow meter can be installed for \$19,952.93. The estimated cost for the salt for the first year is \$500. For an indoor pool the initial application of salt should last for a very long time. The CO2 costs about \$1,500 annually. The fee for the web-based controller is \$360 annually.¹⁰
- A Chlor King salt water chlorinating system with Co2 pH controller can be installed for about \$39,900.¹¹ The estimated cost for the salt for the first year is \$2,964.¹² The CO2 costs about \$1,500 annually.¹³

Operational costs

Aside from the initial start-up, salt is only added to replace what is lost due to splash out, backwashing, pump out or draining, making the additional salt expense very small. And, depending on climate and usage conditions, cells can last up to 7 years, and can be replaced.¹⁴

Electrical costs for the two systems have not been factored in, nor has cell maintenance or replacement.

Advantages of Saline Chlorination

Reduced maintenance

The only maintenance required with salt-water pools, apart from maintaining water chemical balance is periodical cleaning of the cell electrodes. AutoChlor salt water chlorination systems come standard with 'self-cleaning' capabilities to further lessen the burden of maintenance. This means the chlorinator will reverse the polarity of the electrodes periodically in order to reduce the build up of calcium deposits on the

⁷ Clark Smith, President, Water Control System, Inc.

⁸ Ronnie Strassell, Elmwood Fitness Center for 3 pools totaling 139,000 gallons

⁹ Brad Croft, President, Innovative Pool Solutions, Inc.

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¹¹ Artie Cross, A. Cross Pools

¹² Ronnie Strassell, Elmwood Fitness Center for 3 pools totaling 139,000 gallons

¹³ Brad Croft, President, Innovative Pool Solutions, Inc.

¹⁴ Taras Didenko, © Australian Innovative Systems Pty Ltd

cells. Keeping the cells clean will ensure the cells always perform at their peak.

Salt-water pools used to be the exception, now they are becoming a widely accepted method of water treatment in swimming pools. A majority of builders now make salt water systems standard on their new pools. When considering the opportunity to replace the outdated methods of dosing a pool with dangerous chemicals, the safety factors alone are enough reason to upgrade. Though it is usually the realisation that salt-water sanitation is by far the most economical method of pool sanitation that prompts owners to upgrade.¹⁵

Safety

With saline chlorination, chlorine is produced within the system, reducing handling and storage issues associated with tablets or chlorine bleach and acid to treat the pool. This minimizes the need to store chemicals in an on-site facility. Saline chlorination systems can produce up to 25 pounds a day, replacing the need for large amounts of hazardous chemicals.¹⁶

Saline chlorination "removes the risk of fire or explosion, as it does not need chlorine storage."¹⁷

A salt-water chlorinator makes chlorine in the pool water, automatically and continuously, so you no longer have to buy, store or handle the dangerous chemical liquid chlorine. Personal injury risks associated with the storage of chlorine are eliminated, as are the other risks of potentially harmful situations where accidental contact with these dangerous chemicals by pool visitors or maintenance staff can occur. When using salt water chlorination equipment failures no longer represent a life threatening situation or a potential health risk.¹⁸

Bather satisfaction

Our studies show that over 95% of swimmers prefer swimming in salt water pools to any other type of sanitised pools. Salt has a softening effect, just like a water softener, so hair and skin feels soft and silky rather than dry and brittle as with packaged chlorine. The other very important factor is that when the water flows through the electrodes, the chloramines ("dead chlorine" that causes the strong chlorine smell and stinging eyes) are destroyed thus leaving the water in pristine condition.

¹⁵ Taras Didenko, © Australian Innovative Systems Pty Ltd

¹⁶ Susan Shelor, Using Total Water Management-Aquatics, recmanagement.com

¹⁷ Australian Innovative Systems website

¹⁸ Taras Didenko, © Australian Innovative Systems Pty Ltd

Salt water pools are popular because most people who consider themselves "sensitive" or "allergic" to chlorine are not actually reacting to the chlorine at all. This problem usually arises from use of packaged pool chemicals due to additives contained in those chemicals. The same swimmers, who claim allergic reactions to chlorine, typically experience no problems when they are in a salt-water pool. The answer isn't the absence of chlorine. Salt systems generate their own chlorine on-site. The answer is the absence of all the packaged chemicals and by-products of those chemicals.

Environmentally friendly

Salt is a safe and naturally occurring element. A salt-water chlorinator recycles the salt over and over so there are no by-product wastes added to the environment. Due to high efficiency of the technologies used, on-site chlorine generation requires a far less energy consumption when compared to the commercial chlorine plants. Reduced handling of chlorine means less environmental damage due to accidental spillages.¹⁹

Recommendation

Research suggests that salt water chlorination with a CO2 controller is the preferred option for economical and safety reasons. Web-based monitoring makes a lot of sense if on-site monitoring is not practical.

A Salt Water Chlorinating System with a CO2 controller has higher initial costs than a conventional chlorinating system with an acid feeder; however, ongoing chemical costs are significantly less. As a result, depending on the system installed the salt water chlorinating system will have lower overall costs in the second – sixth years of operation.

Competitive systems for salt water chlorination include:

- ChlorKing
- TMI Salt
- Innovative Pool Solutions Resilience.

It is recommended that the designers specify a salt water chlorinating system with CO2 installer with off-site monitoring. With either system knowledgeable maintenance service will be critical to maintaining proper water quality and maximizing the useful life of the system.

¹⁹ Taras Didenko, © Australian Innovative Systems Pty Ltd

Joe Brown Park Pool Chlorination System

Break-Even Analysis

	Conventional Chlorinating System w/Acid feeder	Conventional Chlorinating System w/CO2 Controller	Innovative Solutions Salt Water Chlorinating System w/CO2 Controller	ChlorKing Salt Water Chlorinating System w/CO2 Controller
Vendor	A. Cross Pools	Water Control Systems	Innovative Pool Solutions	A. Cross Pools
Equipment Installation	\$ 12,500	\$ 15,000	\$ 19,953	\$ 39,900
Annual Expenses				
Chlorine	\$ 8,750	\$ 8,750		
Muriatic Acid	\$ 576	\$ -		
Salt			\$ 2,964	\$ 2,964
CO2		\$ 1,500	\$ 1,500	\$ 1,500
Monitoring			\$ 360	
Year 1 Expenditures	\$ 21,826	\$ 25,250	\$ 24,777	\$ 44,364
Year 2 Expenditures	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1 & 2	\$ 31,152	\$ 35,500	\$ 29,601	\$ 48,828
Year 3 Expenditures	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1-3	\$ 40,478	\$ 45,750	\$ 34,425	\$ 53,292
Year 4 Expenditures	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1-4	\$ 49,804	\$ 56,000	\$ 39,249	\$ 57,756
Year 5 Expenditure	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1-5	\$ 59,130	\$ 66,250	\$ 44,073	\$ 62,220
Year 6 Expenditure	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1-6	\$ 68,456	\$ 76,500	\$ 48,897	\$ 66,684
Year 7 Expenditure	\$ 9,326	\$ 10,250	\$ 4,824	\$ 4,464
Years 1-7	\$ 77,782	\$ 86,750	\$ 53,721	\$ 71,148
	Base comparison		< 2 year payback	< 7 year payback