

Ozone Treatment for Residential Pools & Spas



The difference is Crystal Clear with Ozone

Imagine swimming in a crystal clear swimming pool, immersing your body in water that is so pure, clean and odourless, you could almost want to drink it. With an ozone treated pool, you can.

Used in conjunction with traditional pool chemical treatments, Ozonators provide a natural water treatment system that effectively enhances the performance of pool chemicals while removing the unpleasant side effects - such as that sharp chlorine smell - which can often take much of the pleasure out of swimming. A properly installed ozone system will eliminate chemical odours, provide cleaner safer water, and at the same time noticeably reduce the amount of chemicals your pool consumes. Ozone will make your pool safer, easier to maintain, and an even greater pleasure to use.



How Ozone Makes Water Clearer

One characteristic of an Ozone treated pool is the outstanding water clarity. This is the result of the ability of Ozone to combine small insoluble particles that would normally pass through a sand filter, into larger particles that can be effectively trapped by the filter. This process is called flocculation, and Ozone is a very good flocculent. After ozonation, all unused ozone slowly decomposes to normal oxygen and remains dissolved in the water up to the point of oxygen saturation. The result is a crystal clear pool with a clarity that is unmatched.

Chlorine: the good and the bad

Chlorine is the most universally used chemical in swimming pools, and whether we like it or not, it is likely to be around for some time yet. Chlorine is both a good sanitiser, and a powerful oxidiser, but these processes can produce unfortunate by-products that are unhealthy, unpleasant, and unpopular. Some of these unwanted by-products can be partially reduced by replacing Chlorine with Bromine.

The contaminants that are found in pools can generally be classified as Organic, Inorganic, or Microbiological. Organic contaminants can be immediately recognized as body wastes such as perspiration, body oil, urine or nasal secretions, sunscreen creams, ointments, soaps and cosmetics, or introduced organic debris.

When chlorine oxidises organic contaminants, and there can be plenty of these in some pools with high bather loads, chlorinated organics (THM's) can be produced. Some of these are carcinogens, and therefore undesirable. Oxidation of nitrogenous waste matter (i.e. body wastes and sweat) can cause the formation of Chloramines. These are the products that cause the familiar "swimming pool smell" and are the source of the unpleasant chemical side effects such as stinging eyes, ear and skin irritations etc.

Considering that the human body can absorb half a litre of pool water every hour, you would want to swim in safe, chemical free water.

Sanitisation and Oxidisation: the dual cleaning processes

In order to treat any pool water, two treatment processes are required: Sanitisation, and Oxidation. Some compounds, including Ozone and Chlorine, are effective for both treatments. Others, such as ionisers, are sanitisers, but not oxidisers. Ionisers kill the organics, but have no effect on the inorganic contaminants. For that reason, Ozone is always paired with either Chlorine, Bromine or an Ioniser, and it enables pool owners to use significantly less of either chemical.

Ozone in Swimming Pools and Spas

The "good news" is that unwelcome by-products of chlorine can be controlled with the correct use of Ozone.

This is because Ozone is a much more powerful oxidiser than either Chlorine or Bromine, and about 3000 times quicker to act. When used in conjunction with these chemicals, Ozone oxidises contaminants harmlessly.

Ozone should therefore be employed as the Primary oxidiser and Chlorine, Bromine or an Ioniser can be used as a "residual" sanitiser. By applying chemicals to 'good' water that has been thoroughly oxidized, chloramines are prevented from forming and your swimming pool doesn't smell like a swimming pool.

On the other hand, if these waste matters were exposed to chlorine in the pool and Ozone was not present, then chloramines would be formed. Once Ozone is introduced, it still possesses the ability to break down waste to prevent unpleasant odours and related effects.

Ozone & Chlorine

The continued use of chlorine based pool chemicals is becoming more unacceptable in many countries. An ozonator will significantly reduce the amount of Chlorine chemical you use. Chlorine makes an excellent partner for Ozone, particularly in pools that have high bather load or high levels of organic contaminants, such as school pools, or pools with less than ideal circulation such as older pools.

Ozone & Bromine

Although usually more expensive, bromine has a number of advantages over chlorine. While bromamines are good sanitisers, and they do not smell like chloramines. Bromine is also more effective in hot water, and over a wider pH range than chlorine, hence its popularity in spa pools. Bromine is a weaker oxidiser than chlorine and is not as suitable for pools with a high oxidant demand, such as heated pools with a high bather load. Because Bromine has a much lower oxidation potential than Ozone, spent bromine can be oxidised back to active Bromine by Ozone, making it very economical in some situations. People with sensitive skin that react badly to chlorine are often quite at ease in Ozone-Bromine pools.

Unlike chlorine, bromine cannot be stabilised against UV breakdown, however, its breakdown is much slower in sunlight than chlorine.

Ozone-Bromine is best utilised in well designed indoor pools, particularly those that are heated and have a low bather load.

Ozone & Ionisers

Ancient civilisations discovered that water stored in copper vessels remained pure for long periods of time. Today's ionisation process, in which ions (positively charged atoms) are electronically released, is a direct extension of that discovery. Copper ions can pierce the protective outer membrane of a cell to kill algae. Silver ions create a natural bactericide. Copper and silver ions are chemically stable, non corrosive, are not affected by sunlight and are not absorbed through the skin.

Many public Health Departments have approved their use as an effective sanitiser. Ozone, being a strong oxidiser is a material partner to the ioniser. Used in the recommended concentrations, ionisers are completely safe for humans but lethal to algae and bacteria.

Corona Discharge or UV

Ozone can be manufactured using two methods, Ultra Violet Light (UV), and Corona Discharge (CD).

In the UV method, oxygen is exposed to UV light in the 185 nm range, and ozone gas of low concentration is produced. The method is inexpensive, simple but not best suited to spa pools and domestic swimming pool applications.

The Corona Discharge method is the preferred technique suitable for domestic applications and commercial systems. This method involves passing oxygen through an electric discharge to produce large quantities of high concentration gas.

Typical UV generators produce 0.01% to 0.1%, and CD generators, 0.5% to 6% concentration.

As the concentration increases, so does the solubility, so that not only does the CD generator produce more ozone, more of it will dissolve in the water. It can be seen therefore that CD produced Ozone will be much more effective than UV produced Ozone, as it is up to 10 times more soluble in water.

Sizing for Commercial Pools

OZONZ can advise commercial pool builders to calculate the size of the Ozone system required.

Please supply your pool volume, turn-over rate, bather load, water temperature, and other relevant information. Contact OZONZ or your dealer for more information.

Sizing your Ozonator

"..if the pool is to properly enjoy the benefits that ozone can give, then sufficient Ozone must be applied.."

These dosing rates will help determine how much Ozone your pool needs. Note that if insufficient Ozone is applied, more chemicals will be required to meet the demand for an oxidiser. Therefore sufficient Ozone must be applied to deliver full benefits. Any Ozone that is not used will simply be converted back to Oxygen.

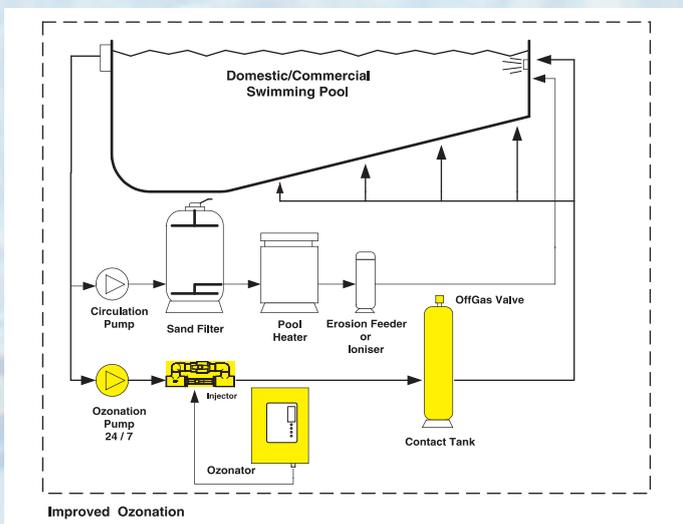
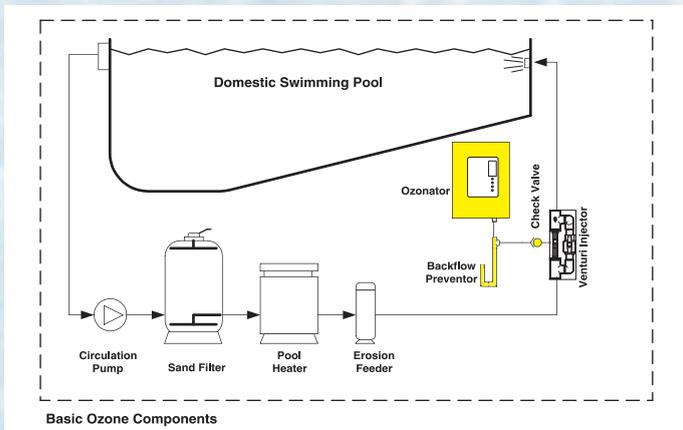
Estimate the size of Ozonator you require from the table below. This calculation applies to low bather load, unheated outdoor pools. Please contact OZONZ for specific advice.

Model	Type	Ozone Output	Ioniser	Max Pool Volume
Spa Pools				
CX-100/CXP-250	CD		150-Spa	2-4 persons
CX-500/CX-750	CD		150-Spa	4-8 persons
Swimming Pools				
P15	CD	0.75 g/hr	350-NZ	50,000 litres
P15/AD	CD	1.25 g/hr	450-NZ	90,000 litres
P31/AD	CD	2.80 g/hr	650-NZ	180,000 litres
P51/AD	CD	4.50 g/hr	1050-NZ	250,000 litres



Typical Ozone Installation

Ozone is generated in an Ozonator and introduced into the pool water through a venturi injector in the return line to the pool. Several methods can be used to achieve this, depending on the installation. The following two diagrams show the most common installations:



Pool Chemistry

In any pool system using Ozone, none of the normal chemical requirements change other than that the residual sanitiser levels can be maintained at a much lower level. In most cases, levels of residual chlorine or bromine will be maintained at values so low that their presence be virtually undetectable. Water balance should be maintained the same as in any pool, and all chemicals used will function just the same as if ozone was not being used.

Chemical	Value	Comment
Chlorine	0.2 ⇔ 0.5 ppm	Domestic Pools
	0.4 ⇔ 1.0 ppm	Domestic Spas
pH	7.24 ⇔ 7.4	Plaster Pools
	6.8 ⇔ 7.2	Fibre Glass Panels
Total Alkalinity	80 ⇔ 125 ppm	Plaster Pools
	125 ⇔ 150 ppm	Others
Calcium Hardness	200 ⇔ 275 ppm	Plaster Pools
	175 ⇔ 225 ppm	Others
Total Dissolved Solids (TDS)	< 2500 ppm	Domestic Pools
	< 1500 ppm	Domestic Spas
Copper	0.3 ⇔ 0.6 ppm	Others
Phosphates	< 0.4 ppm	Others

Frequently Asked Questions

What are the benefits of using Ozone in my pool?

Ozone is used in pools to improve the quality of the water. It does this by reducing the amount of chemicals required, eliminating the unpleasant side effects of these chemicals, and improving the performance of the filtration equipment. The result will be a pool that is **brilliantly clear, nicer to swim in, and safer and easier to look after.**

Ozone:

- is a powerful oxidiser, produced on site continuously
- improves water quality
- is non irritating
- is tasteless
- reduces unpleasant chemical odours
- is kinder to bathers, kinder to equipment

Will I still have to use chemicals in the pool?

Yes, but with a significant lower level of Chlorine (say 0.2 - 0.4ppm) to maintain sanitation.

Why not just use Chlorine?

Chlorine reacts with organic waste and forms highly toxic chloro-organic compounds (THM's). Some of these are carcinogens and these toxins may accumulate to very high concentrations especially if a regular flush of makeup water is not in place. Irritations to skin, eyes, nose or ears are the most instant and obvious effects.

“The use of Ozone therefore ensures a much safer pool under all conditions”

What if I don't want to use any chemicals?

Increase the ozone dosage by selecting a 'larger' ozonator and use an ioniser. You may occasionally have to use a non-chlorine based shock.



Frequently Asked Questions cont...

Will Ozone damage my pool equipment?

On the contrary, as Ozone can only be added to the water at the rate it is generated, it is not possible to 'overdose' as can happen with manually added chemicals. Once Ozone is dissolved in the water, it is not considered to be any more aggressive than any other oxidising chemical. With the worldwide trend towards the increased use of Ozone, most equipment manufacturers are manufacturing their products with 'Ozone-resistant' materials. Avoid the use however of exposing natural rubber or nylon materials to high levels of dissolved Ozone.

Will my pool be harder to look after?

No. Normally it is the addition of chemicals that unsettle the chemical balance of the pool water. When the chemical additions are reduced through the use of Ozone, the pool is able to settle down, and less time, effort and chemicals are required to maintain correct water balance.

Will the Ozone stop my pool going green?

Not necessarily, but it is much less likely to happen. If a pool goes green it almost always means that conditions have not been right for some period of time, and a number of things could have caused the problem.

What happens if something does go wrong with the pool?

By wrong people usually mean, GREEN. If this happens, it is because the chemicals used cannot control the pool correctly. The conditions or use of the pool may have changed, or the correct chemicals are not being applied. Either way, provided the Ozone is still being applied, the solution is to sort out the problem with the chemicals.

In other words, if the Ozone is working, forget it is there, and treat the pool just as you would any other "chlorine" or "bromine" pool.

What are some of the things Ozone will not do for my pool?

It will not scrub the sides of the pool, backwash your filter, plug leaks, bring in the washing, or take the dog for a walk.

What happens if something goes wrong with the Ozone?

If for any reason the Ozone equipment stops working, or it comes time to service the equipment, simply increase the application of the chemicals until the Ozone is back in service.

How do I test for Ozone in the pool?

You do not need to test specifically for Ozone in a domestic pool. Simply carry out the normal water tests prescribed by your pool consultant.

How long should I run the filter pump?

The job of the pool filter is to remove suspended matter from the water. The amount of time the filter pump runs depends on the amount of water in the pool, and the size of the pump. Your pool builder can advise you on the minimum run time.

Remember:

- Adequate filtration is essential in any pool. Your pool will never look good without sufficient filtration.
- You cannot "over-filter" your pool.
- Insufficient filtration will greatly affect the workload of the Ozone and the chemicals.
- Ozone will be going in to your pool all the time the filter is running.

Don't be afraid to extend the running time of the pump, especially in the peak of the swimming season. Your Ozone equipment has the ability to produce a powerful sanitiser for your pool, 24 hours a day, and the small extra cost of the electricity may well be compensated for by the savings in chemicals. Up to 80% of the water treatment of your pool is taken care of by the filter, so don't be afraid to use it.

To summarise:

Improved Water Quality

- Ozone adds brilliant clarity to the water
- The water is softer
- Reduces total dissolved solids (TDS) by coagulating particles
- Ozone has neutral pH (that means it does not affect the pH of the pool)
- Ozone is not pH dependant (that is it is effective regardless of the pool pH)
- It produces no toxic by-products; no chloramine build-up
- No irritation to the eyes, nasal passages or throat
- No more dried out skin, bleached hair or faded swimwear
- It neutralises body oils, soaps and their suds
- The by-products of Ozone are heat, filterable solids and pure oxygen

Cost Saving

- Reduces chemical consumption significantly (amount depends on Ozone generator size)
- Ozone instantly turns combined chlorine into "free-available" chlorine, making it 100% useable.
- Reduces TDS, so you don't have to drain the pool, saving money on water costs (& chemical costs)
- Prolongs the life of the equipment by reducing calcium and scale build-up.

Maintenance Savings

- Weekly, rather than every other day chemical check
- Reduce the need to store large quantities of toxic chemicals
- Pool requires fewer cleanings
- Less calcium build up on plaster

