

SPA OZONE SYSTEMS



Ozone is a sky-blue gas and is formed naturally by the action of the sun's UV (ultraviolet) rays splitting an oxygen molecule (O_2) and one individual oxygen atom attaching itself to another oxygen molecule. This is ozone and is expressed as O_3 . It can also be formed when a large electrical discharge passes through oxygen (eg. lightning). It is a relatively unstable, highly toxic gas

which decomposes to re-form oxygen and is a very effective bactericide. Ozone is also referred to as activated oxygen, allotropic oxygen or triatomic oxygen. Ozone is second only to fluoride as the most powerful oxidizer or oxidant in the world for sanitation. It will break down most chemicals into their basic naturally occurring component parts.

- Ozone is a natural purifier (meaning no harmful chemical by-products are created during the purification process)
- Ozone has a clean, fresh scent like that noticed after a rainstorm.
- Ozone is the most powerful oxidizer that can be safely used in a swimming pool or spa.
- Ozone is the alternative water purifier to traditional spa or hot tub chemicals such as chlorine and bromine.

With advances in technology and cost reductions ozone sanitization in pools and spas is becoming more and more popular. Compared with Chlorine, Ozone purifies water 3,000 times faster and leaves no by-products except pure oxygen, whereas chlorine produces hypochloric acid and other salts in water applications. In the quantities needed for water purification, ozone does not irritate people or equipment or have any noticeable smell, taste or colour and it eliminates much of the routine maintenance because it does such an effective job keeping the water clean. However because of its toxicity only so much of it can be used at once so it cannot be used as the only sanitation system but has to be used with chlorine or bromine.

How Ozone Systems Work

Ozone treatment has been used for many years, particularly in Europe, for the treatment of municipal water supplies and also large commercial and Olympic pools. Developments in ozone technology over recent years has enabled manufacturers to produce smaller more economical generators which are suitable for domestic spas or hot tubs. Because of its strong oxidation and disinfection mechanism, ozone is very useful for domestic water treatment although safety considerations limit its application and it is only used as a supplementary system in conjunction with other sanitizers for the reasons noted above. Ozone is an unstable compound generated by the exposure of oxygen molecules to a high energy electrical discharge or ultraviolet rays. The weak bond holding ozone's third oxygen atom is what causes the molecule to be unstable and thus, very effective.

An oxidation reaction occurs upon any collision between an ozone molecule and a molecule of an oxidizable substance (i.e. bacteria, fungi and mold) and the weak bond splits off leaving oxygen as a by-product (O_2). During an oxidation reaction, organic molecules are changed and dissolved metals are made no longer soluble. Ozone is one of the most effective disinfectants and oxidizers available and once introduced into the water it starts to work immediately, killing bacteria and oxidizing organic waste. As ozone is not highly soluble in water, the ozone must be injected into the water by either a compressor or a venturi system. However, as ozone is also toxic, all traces of it must be used or removed prior to reaching the spa or hot tub as there can be no residual ozone contained in the water.

Therefore, some other form of residual sanitizer like chlorine or bromine must also be used in order to provide continuous protection when the ozone generator is not running and the spa or hot tub is in use. Naturally, using ozone as an oxidizer means a much smaller amount of chemical sanitizer will be needed to sanitize the spa or hot tub and provide the necessary residual sanitizer level.

Types of Ozone Systems

There are two different ozone systems commonly used today in spas and hot tubs: the Ultraviolet (UV) technology and Corona Discharge (CD) technology.

Ultraviolet Light (UV) - Generation of ozone using UV is achieved by passing air over a UV light source and then mixing the gas with water.

Corona Discharge - In this method, air is passed through an electrically charged chamber. What could be called a miniature lightning storm is created in the chamber which electrically converts the oxygen into ozone.

Installation of Ozone Systems

Ozone systems can be installed in several different ways however the most common way is with a venturi injector which is plumbed into the main return line after all other spa or hot tub equipment, ie heater and pump. It is designed to operate in unison with the units main time clock and sanitation takes place automatically whenever the filtration system operates.

The other way of installing an ozonator is through the suction side of your pump. In this installation, the ozonator becomes a secondary oxidizer providing a method to degrease and clean the filter. In either case the effectiveness is the same and the water that the ozone has been injected into can be returned to the spa or hot tub either through the massage jets or, optimally, through a dedicated jet.

Ozonator Maintenance

Corona discharge ozonators require no maintenance although they contain a chip that needs to be replaced every few years of operation. On some models it is necessary to replace the entire unit as the chips are not available or the cost of the chip and its replacement is the same as a new unit. Some have a window or other viewing port through which you can see if the device is still working or not. Ultraviolet ozonators have a fluorescent light that can burn out and can be replaced when necessary. Consult with your dealer as to what maintenance is required for your ozonator and its cost.