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## OZONE & OZONATORS

### What is Ozone?

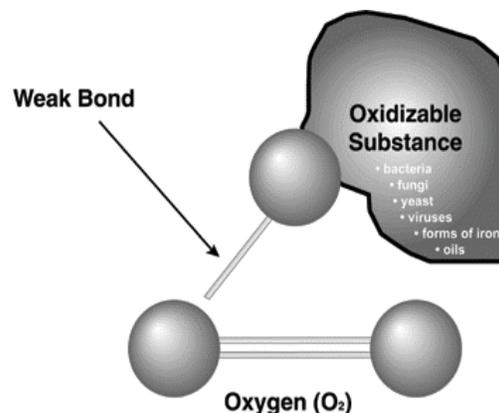
- Ozone is "active oxygen" - an ozone molecule consisting of three oxygen atoms. It has a clean, fresh scent often noticed after a rainstorm
- Ozone is created in nature by the combination of oxygen in the air and ultraviolet rays of the sun or by the electrical discharge during a lightning storm. The Ozone layer in the atmosphere protects the earth from deadly radiation and there is a small amount of ozone in the air we breathe.
- Ozone is a natural purifier; no harmful chemical by-products are created during purification.
- Ozone is a powerful oxidizer or disinfectant and kills all known bacteria, viruses, cysts, yeasts, moulds and mildew by oxidation.
- Ozone helps oxidize hydrogen sulphides, iron, manganese and most chlorinated hydrocarbons found in water as well as oils.
- Ozone is healthy; its by product is oxygen, it does not leave any chemical taste or smell, it will not cause any personal discomfort, irritation or damage to hair, eyes, skin, nose or ears and it is not a carcinogen.
- Ozone is environmentally safe and when used properly or in domestic applications it will not produce harmful fumes.
- Ozone's first commercial use was in a municipal water system in 1906. It is now

used in a wide variety of industries worldwide including wastewater plants, water parks, zoos, aquariums, food manufacturing and water bottling as well as commercial & residential pools and spas.

### How does it work?

Ozone is an unstable compound. The weak bond holding ozone's third oxygen atom causes the molecule to be unstable and gives it its effectiveness as a sanitizer.

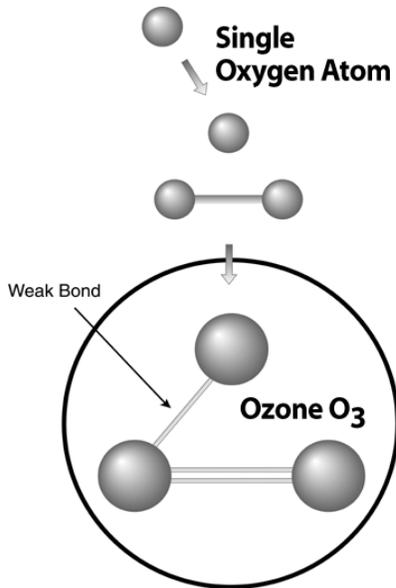
An oxidation reaction occurs upon any collision between an ozone molecule and a molecule of an oxidizable substance e.g. bacteria, fungi, viruses, and some minerals (iron & manganese).



The weak bond breaks and the single oxygen atom attacks the oxidizable substance. The resultant material is inert and is eventually removed from the water by filtration. Oxygen is the by-product.

## How is ozone made?

Ozone results from the process where an oxygen molecule (O<sub>2</sub>) is split into two oxygen atoms and each atom attaches itself to another oxygen molecule thereby forming O<sub>3</sub>.



Technology has developed to allow the production of Ozone on-site in domestic situations via the use of an “ozonator”. Two production styles or ozonator types exist.

**Ultraviolet (UV) light** – a somewhat similar process to ozone creation in the atmosphere. A UV lamp is used to generate ozone.

**Corona Discharge.** This utilizes electrical energy to split the oxygen molecule, similar to the effect of an electrical storm.

## Ozone & Spa pools

Ozone is fast gaining recognition and popularity as a principal sanitizer or water purifier for spa pools.

Traditional sanitation processes using chlorine or bromine chemicals create chloramines and bromamines as by products. Not only does Ozone not produce any chemical by products but it oxidizes pathogens many times faster than traditional processes.

Ozone does have limited life however. As a result it is not effective against algae and, whilst it could be used on its own, it is recommended that it be used in conjunction with a sanitation process that provides residual sanitizer, eg chlorine or bromine. Because ozone, when in use, will be actively sanitizing, the residual chemicals will last considerably longer and the amounts used greatly reduced.

Ozone has greatest effect by being exposed to and dissolved in water automatically before entering the spa.

## Factory installed ozonators with dedicated fittings

The fittings consist of long air and water lines that allow ozone to be drawn into the water line and thoroughly mixed before released into the pool. The ozonator operates automatically whenever the pump is running.

Spas are manufactured either with or without the dedicated fittings. A spa may be ordered with dedicated fittings to allow an ozonator to be installed subsequently.

## Ozonator model - Dell MCD50

Ozone is produced by corona discharge. Ambient air is passed through an air gap between a high voltage electrode and a stainless steel grounded electrode. The “energy field of electrons” created by the high voltage electrode instantly converts oxygen (O<sub>2</sub>) molecules to ozone (O<sub>3</sub>).

The Dell MCD50 has a life expectancy of 15,000 hours or 3-5 years of normal usage. Replacement of the chip and capacitor may be required at that point.

## Costs (Gst inclusive)

Ozonator system	\$700
Fittings only	\$200

Electricity usage is minimal. The estimated cost is less than \$15 per annum.