

Scavenger2000's Technology

THE SYSTEM:

When ozone and UV light is added to the aeration/oxygenation process of the Scavenger2000 water decontamination and regeneration vessel, several unique abilities result in being greater than either of the processes applied in solo. Rather than having simply an aeration stream, an environmentally safe and effective disinfection process is carried out in the waters where the Scavenger2000 operates.

Ozone and UV Light have been applied with great benefit in the municipal sewer treatment process worldwide, because of its ability to disinfect water without leaving any harmful by-products as, does chlorine. In fact, ozone was found through laboratory examination to be over 100 times as powerful as chlorine in destroying E-Coli bacteria.

There are no other vessels in the world today that have all the capabilities of the Scavenger2000 water decontamination and regeneration vessel.

BENEFITS OF COMBINED AERATION, OXYGENATION and OZONE IN WATER

Reduces turbidity: Ozone alters the surface charge which allows suspended particles to coagulate, they then are removed by sedimentation, filtration or flotation.

Odor removal: Organic and inorganic compounds containing sulfur and nitrogen are oxidized to simple odor free compounds.

Color removal: Ozone treatment oxidizes double bonds to single bonds which are simple compounds, generally clear. Tests at Nova University show that water clarity improved by more than 50%

Algae control: Algae is a natural odor generator. Ozone indirectly kills algae by oxidizing the organic chemicals and some nutrients that algae feeds on.

Red Tides: Ozone oxidizes the toxic algae that cause red tides.

Pesticide removal: Ozone effectively oxidizes most pesticides, insecticides, herbicides, and fungicides that get washed into the watershed.

Increases DOC: (Dissolved Oxygen Content). The life force of the water is oxygen. Ozone is a triatomic oxygen that becomes oxygen anywhere from a few seconds to a few minutes. This increases the oxygen in the water.

Sheen: Ozone oxidizes some of the oil sheen in the water.

BIOLOGICAL:

Kills pathogens: Ozone is a powerful defense against the microbial contamination of water.

Cryptosporidium, a parasite, is one of many dangerous micro-organisms that ozone will kill. It also kills pathogens such as physteria.

Kills fecal coliform: Often in storm water run off, there are sewage spills or agricultural waste going directly into the waterways. Ozone can be a defense mechanism against such pollution.

Tests effectuated at Nova University have demonstrated that Fecal Coliform decreased 95% with the use of oxygen and ozone combined..

Inactivates virus: A virus cannot survive when exposed to the ozone molecules. Tests have proven that viruses of all kinds are inactivated when mixed with ozone. Waterborne virus is a serious concern in our waterways.'

OZONE IS SAFE

Chlorine and Ozone are disinfectants, but unlike chlorine, ozone is non-toxic. Ozone also inactivates viruses in water whereas chlorine ineffective. The Scavenger2000 uses special techniques to generate ozone and oxygen on board then drives the ozone into the water.

Depending on conditions, the ozone life expectancy can vary from a few seconds to a few minutes where upon ozone goes back into its normal oxygen state.

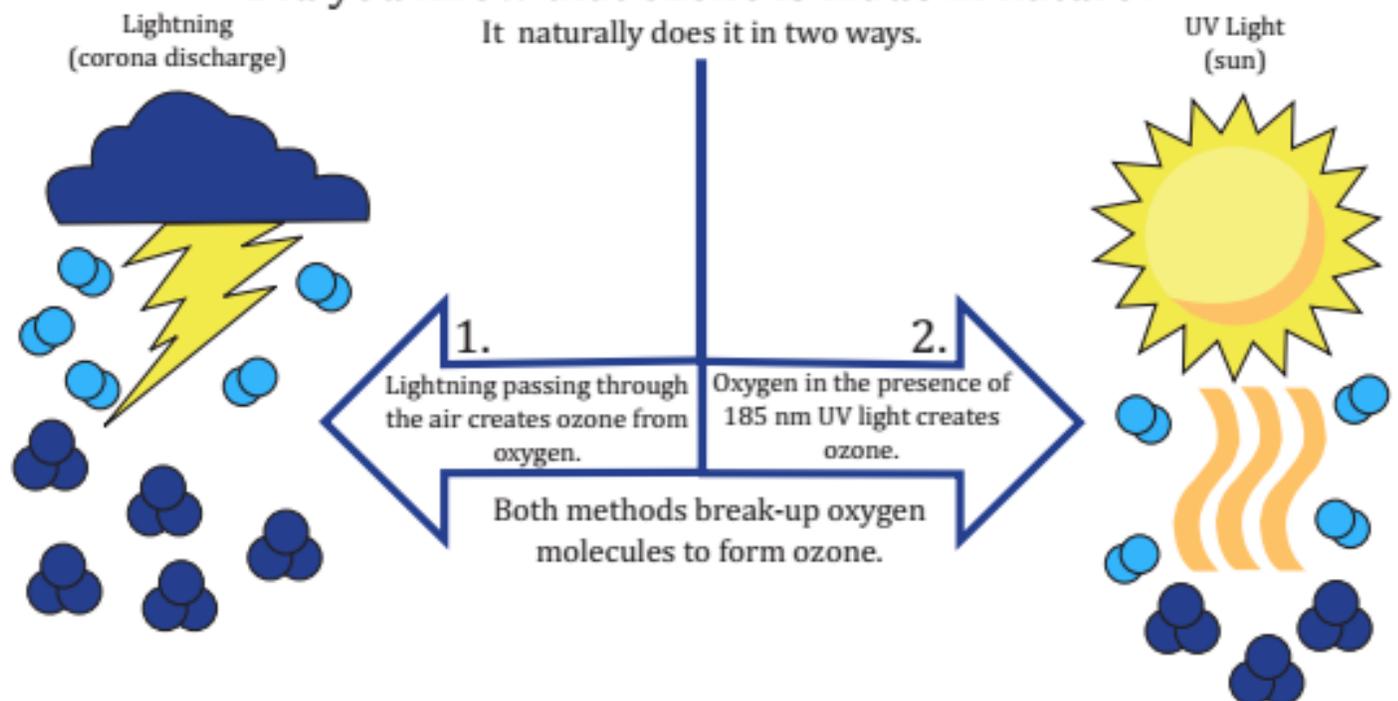
The amount of dissolved ozone is so minute it only affects micro-biological pollutants.

The natural plant life is not affected due to the short contact and small concentration of ozone.

Ozone converts into oxygen in seconds. This procedure supports chemical oxygen demand (COD) removal, cracks undegradable substances so that they become digestible to bacteria, and supports the aerobic oxidation of toxic nitrogen compounds, allowing extremely high fish loads while at the same time maintaining excellent water quality.

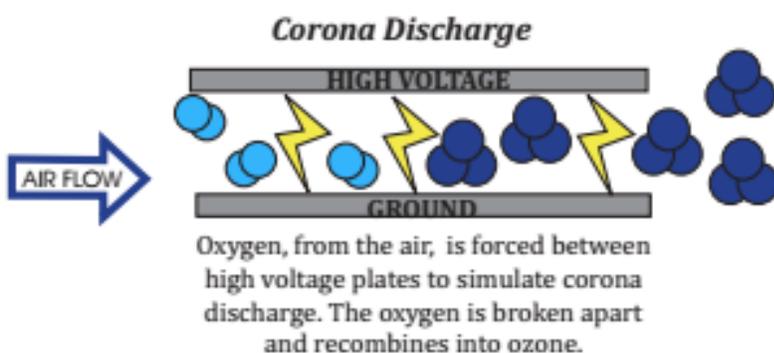
How is Ozone Made?

Did you know that ozone is made in nature?



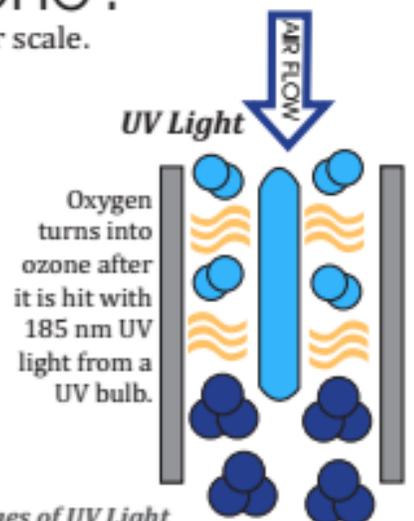
How do we make ozone?

Same methods as above but on a much smaller scale.



Advantages of Corona Discharge

- Generates high ozone concentrations
- Best for water applications
- Fast organic (odor) removal
- Consistent ozone output



Advantages of UV Light

- Simple construction
- Lower cost than corona discharge
- Output less affected by humidity

Concentrated Oxygen -

Concentrated Oxygen refers to oxygen which is of minimum 90% pure with moisture removed -100 deg F dew-point. It is produced from an oxygen concentrator

Advantages:

- Allows a consistent ozone output over time.
- Eliminates corona cell maintenance (very important).
- Virtually all moisture is removed.
- Ozone output is typically doubled (2x) vs. using dry air!
- Higher concentrations means very soluble in water.



Ozone and Wastewater/Stormwater Disinfection



Wastewater/stormwater Disinfection

The use of ozone for wastewater disinfection has been growing in popularity due to strict regulations on fecal coliform and other pathogens. As chemical costs rise, ozone becomes a more cost effective solution for wastewater/stormwater disinfection. Ozone can be produced on site using oxygen from the ambient air. Only electrical power is required for operation.

When discharge limits on pathogens are lowered, the natural solution is to add additional chemicals to meet these new limits. Adding more chemicals to a wastewater stream effluent for disinfection may seem like an easy solution at first; however, in many cases these chemicals must then be removed from the effluent wastewater prior to discharge due to limits on these chemicals. For example, if chlorine is used for the reduction of E.coli the chlorine must be removed using de-chlorination prior to wastewater discharge. If 20% more chlorine is required to meet the new wastewater discharge limits, 20% de-chlorination must also be applied to this water. Over time, these costs can really add up.

Ozone's reactive properties allow it to quickly kill bacteria. In fact, ozone is ten times stronger than chlorine as a disinfectant.

Ozone is a green solution

Ozone is a green solution to wastewater disinfection. Ozone is produced on site and is all natural, formed from only oxygen. No by-products or waste products are formed in the creation of ozone.

- The use of ozone eliminates the need to transport chemicals to the site.
- Ozone is produced on-site from air and electricity, all renewable resources.
- Ozone is a completely renewable resource.
- Potential hazardous storage of chemical is removed with ozone use.
- After ozone is dissolved into water, ozone reverts to oxygen leaving no residual in the water.

Action in Water	Chlorine	Ozone
Oxidation Potential (Volts)	1.36	2.07
Bacteria Disinfection	Moderate	Excellent
Virus Disinfection	Moderate	Excellent
Environmentally Friendly	No	Yes
Color Removal	Moderate	Excellent
Carcinogen Formation	Likely	Unlikely
Organics Oxidation	Moderate	High
Micro flocculation	None	Moderate
pH Effect	Variable	Lowers
Water Half-Life	2-3 Hours	20 Minutes