



Ozone in Soil & Groundwater Application

Why use Ozone for soil & groundwater remediation?

Ozone use has evolved from water treatment to soil & groundwater remediation. Recently, ozone has been used to clean up sites containing variety of soil contaminants. The reason for using ozone is to target those compounds that are not biodegradable, or the ones which are biodegradable over a long period of time.

In populated or commercial areas (shopping malls, gas stations, etc.) excavation may not be an option. Ozone is a safe, reliable green alternative to other, more expensive treatment methods.

Commonly treated contaminates with ozone in groundwater

- MTBE (Methyl Tertiary Butyl Ether)
- TBA (Tert-Butanol)
- BTEX
- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- Hydrocarbons
- Diesel fuel
- TCE
- Pesticides
- Chlorinated Solvents
- VOC's (Volatile Organic Carbons)
- Aliphatic Hydrocarbons
- Polyaromatic Hydrocarbons
- 1,4 Dioxane
- PCE

Oxidation Technologies provides turnkey Ozone Remediation Systems custom built for your specific project. We have extensive experience as a system integrator of remediation systems implementing ozone, AOP, and other technologies with necessary.

ABOUT OZONE

OVERVIEW

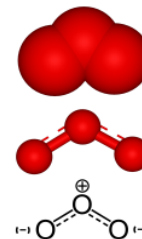
The oxygen atom is unstable in the atomic form. Oxygen is stable in the diatomic form as O₂. The air we breath today is made up of about 21% oxygen, this makes oxygen one of the most common molecules found in nature today.

Ozone is a triatomic form of oxygen, meaning that the molecule, ozone, is made up of 3 oxygen atoms. Unlike oxygen, ozone is a visible gas with a light blue color at very high concentrations. At low concentrations ozone is colorless. Ozone also has a distinct odor that is noticeable at very low levels and may be associated with a “clean” smell, at higher levels ozone has a very pungent odor. Ozone is an unstable gas that readily decomposes to oxygen naturally. Ozone is also a highly reactive gas that acts as a very strong chemical oxidant.

HOW DOES IT WORK?

Ozone is a gas that is found in nature (the ozone layer) but can also be produced for commercial and industrial applications. The uses of ozone are many, and growing every day. This is a beginning introduction to ozone and will provide a basic understanding of what ozone is, how it is used, and the application of commercial ozone use in our world today.

Ozone is a triatomic form of oxygen, three oxygen atoms together to form one molecule.









Key Benefits to using ozone in your remediation systems

- *Low capital equipment costs*
- *Ozone is produced on site, eliminating the need to purchase or transport hazardous chemicals*
- *Minimal site disturbance during installation*
- *Low on-site profile*
- *Low operating costs*
- *In-situ destruction of targeted components*
- *Rapid decrease of contaminant mass and concentration in soil and water – impressive results may be seen in weeks*
- *No vapor control necessary – contaminants are destroyed rather than transferred from one phase to another*
- *Microbubbles act to extract VOCs from groundwater and soil pores which reduces soil oxidative demand*

Oxidation potential of Ozone

Oxidant	Electrochemical Potential I (Volts)
Free Radical, (-OH)	2.8
Ozone atom (O)	2.42
Ozone, (O ₃)	2.07
Hydrogen Peroxide, (H ₂ O ₂)	1.78
Potassium Permanganate, (KMnO ₄)	1.7
Chlorine Dioxide, (ClO ₂)	1.57
Chlorine gas, (Cl ₂)	1.36
Oxygen, (O ₂)	1.23
Bromine	1.09
Hypochlorous Acid, (HOCl)	0.95
Sodium Hypochlorite, (NaOCl)	0.94
Iodine	0.54

Product Types for Groundwater Remediation

						
UNITS & FEATURES	ORT Series	ORK Series	ORC Series	OST Series	OXS Series	ISX Series
Description	Complete Trailer System	Kit for trailer, shed, cargo container or existing structure	Cabinet System	SS Water Injection System	Standard Water injection system	Large scale turnkey water system
Application/ Usage	In-situ	In-situ	In-situ	Pump & treat	Pump & treat	Pump & treat
Ozone Production	75 g/hr – 756 g/hr	75 g/hr – 283 g/hr	19 g/hr – 15 g/hr	8 g/hr – 100 g/hr	8 g/hr – 100 g/hr	150 g/hr – 1,500 g/hr
Style	Turnkey	Modular	Modular	Skid - POU	Skid - POU	Turnkey
Contact Tank	no	no	no	yes	20 – 50 gallons	no
Remote control	yes	yes	yes			
MAJOR Components Included:						
Ozone Generator	X	X	X	X	X	X
Oxygen Concentrator	X	X	X	X	X	X
Air Compressor	X	X	X	Optional	Optional	X
Air Dryer	X	X	X			X

ABOUT US

Oxidation Technologies specializes in ozone system integration of automated turnkey ozone systems for most any ozone applications. We supply ozone systems, ozone generators, and ozone-related accessories along with providing service, repair, and maintenance services.

Whether you are looking for your first ozone system, upgrades to your existing system or service and maintenance parts let our ozone application experts help you find the right equipment for your application. We would be glad to put our experience to work for you.

One of our primary focuses is safety; therefore we carry a wide variety of ozone gas sensors, along with other gas sensors for most every potentially toxic gas.

Oxidation Technologies was formed by ozone application experts who wanted to take knowledge of ozone and uses for ozone to new heights. We have been providing ozone system integration and ozone products for over 20 years. We now offer ozone integration along with H₂O₂ or UV systems to provide Advanced Oxidation Process (AOP) Solutions.

Our goal is to provide engineering services along with consulting and basic advice on how ozone may work for your application. We know ozone is easy, but ozone application is not easy and requires knowledge, experience, and the proper equipment for the job. We want every ozone installation, whether it is ours, or an existing system to achieve the goals required and to create a positive reflection of the ozone industry as a whole.

If you need help with your ozone oxidation application, or even just have a question of if ozone or other oxidation is right for you, please contact us today. We would be glad to see if we can put our experience to work for you.

WHY USE OXIDATION TECHNOLOGIES:

There are many ozone companies that will provide equipment or complete turnkey systems. So, what makes our systems better? *Experience*. Plain and simple we have been on-site and operated ozone remediation systems for many years.

Details matter, and we know what details are important what are not. Producing ozone is easy, however, building a reliable and effective ozone system is not easy. There are many parts that need to work together perfectly for many hours without human oversight. Our extensive experience allows us to make sure the details of your ozone system are right, to ensure maximum run-time and reliability.

Let us help you ensure your system will operate for many years reliably and effectively.

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