SAFETY DATA SHEET

1. PRODUCT IDENTIFICATION

Product Name: Ozone
Common Name, Synonyms: O_3, Triatomic Oxygen, Trioxygen
Manufacturer: **Pacific Ozone Technology**
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Product Use: This SDS is limited to ozone produced in gaseous form on site by an ozone generator, in varying concentrations, in either air or aqueous solution, for the purpose of disinfection, sanitization, odor abatement, oxidation of organic compounds and in organic compound, or as an antimicrobial intervention, in a variety of applications.

2. HAZARD IDENTIFICATION

GHS Classification

Physical		Oxidizing Gas
Health		Skin Irritation: Category 3
		Eye Irritation: Category 2B
		Respiratory System Toxicology: Category 1 (Acute & Repeated Exposure)
Environmental		Acute Aquatic Toxicity: Category 1

Note: Severe respiratory toxicity will develop before skin or eye irritation go beyond listed categories. **Anyone with chronic pulmonary problems, especially asthma, should avoid exposure to ozone.**

WHMIS Classification (Workplace Hazardous Materials Information System, Canada)

	**A**	Compressed gas
	**C**	Oxidizing material
	**D1A**	Poisonous and infectious material – Immediate and serious effects – very toxic
	**D2A**	Poisonous and infectious material – Other effects – very toxic
	**D2B**	Poisonous and infectious material – Other effects – Toxic
	**F**	Dangerously reactive material

Source: CCOHS, CHEMINFO Record Number 774

3. COMPOSITION

Chemical Name:	Ozone
Chemical Formula:	O_3
Common Names, Synonyms:	Triatomic Oxygen, Trioxygen
CAS Registry No:	10028-15-6
NIOSH RTECS No:	RS8225000

4. FIRST AID MEASURES

Skin Contact:	Flush skin with lukewarm water. If irritation persists, seek medical help
Eye Contact:	Flush eye with lukewarm water for 15 minutes. If irritation, pain, swelling, lacrimation or photophobia persists, seek medical help
Ingestion:	Unlikely as product is a gas
Inhalation:	Move to uncontaminated area. Monitor for respiratory distress and administer oxygen or artificial respiration as needed. If irritation persists, seek medical help

Medical Conditions Aggravated By Exposure:
Exposure to ozone can aggravate or accelerate pre-existing respiratory diseases. Pulmonary inflammation from exposure may increase susceptibility to pulmonary disease. Irritant properties may aggravate pre-existing eye conditions

5. FIRE FIGHTING MEASURES

Flash Point:	None
Auto-Ignition Temperature:	Not Available
Flammability:	Ozone itself is not flammable. As a strong oxidant, it may accelerate, even initiate, combustion, or cause explosions
Extinguishing Media:	Use extinguishing media appropriate for the fuel source
Special Fire Fighting Procedures:	Use NIOSH/MSHA approved full facepiece self-contained breathing apparatus (SCBA) operated in positive mode and full turnout gear
Unusual Fire & Explosion Hazard:	None expected

6. ACCIDENTAL RELEASE MEASURES

Turn off Ozone Generator. Ventilate and evacuate the area until ozone levels subside to a safe level (< 0.1 ppm).

7. HANDLING AND STORAGE

Ozone must be contained within ozone resistant tubing and/or pipes from the generation point to the application point. Any leaks are to be repaired before further use of the ozone generator.

Ozone is only generated at point of use and is not stored under any circumstances. It is to be used only as stated by manufacturer's recommendation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OSHA Permissible Exposure Limit:	8 hour TWA 0.1 ppm
ANSI/ASTM:	8 hour TWA 0.1 ppm, STEL 0.3 ppm
ACGIH:	8 hour TWA 0.1 ppm, STEL 0.3 ppm
NIOSH:	ELCV 0.1 ppm light; 0.08 ppm moderate; 0.05 ppm heavy Light, moderate, heavy work TWA <= 2 hour: 0.2 ppm Immediately Dangerous to Life or Health (DLH) 5 ppm
Respiratory Protection:	Use full facepiece self-contained breathing apparatus for entering areas with a high concentration of ozone
Engineering Control:	Use ozone destruct unit for off gassing of ozone

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Gas
Molecular Weight:	48.0
Appearance:	Clear at low concentration, blue at higher concentration
Explosive Limits:	N/A
Odor:	Distinct pungent odor
Vapor Pressure:	> 1 atm
Odor Threshold:	Pungent odor generally detectable at 0.01 to 0.04 ppm, and a sharp disagreeable odor at 1.00 ppm
Vapor Density:	1.6 (air=1)
pH:	N/A
Relative Density:	N/A
Freezing Point:	-193°C / -315°F
Solubility in water:	19 mg/l (20°C, 4% O_3 in O_2)
Boiling Point:	-112°C / -169°F
Flash Point:	N/A
Evaporation Rate:	N/A
Flammability:	N/A
Partition Coefficient:	N/A
Auto-Ignition Temperature:	N/A
Decomposition Temperature:	N/A
Viscosity:	N/A

10.STABILITY AND REACTIVITY

Reactivity:	Ozone is highly reactive with substances susceptible to oxidization. Reactions with some materials such as alkenes, ether and other compounds are highly unstable and explosive
Chemical Stability:	Ozone is highly unstable and will readily react and spontaneously decomposes under normal ambient temperature
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Do not concentrate ozone to high level (>=17% wt). The decomposition of ozone at high concentrations can be explosive
Material Incompatibility:	Avoid contact with materials susceptible to oxidization
Hazardous Decomposition:	Ozone decomposes rapidly to oxygen in exothermic reaction, releasing energy by heat as it decomposes

11. TOXICOLOGICAL INFORMATION

Likely routes of exposure:	Inhalation, Ingestion, Skin Contact, Eye Contact	
Effects of Acute Exposure:	Discomfort, including headache, coughing, dry throat, shortness of breath, pulmonary edema; higher levels of exposure intensify symptoms. Possible irritation of skin and/or eyes.	
Effects of Chronic Exposure:	Similar to acute exposure effects, with possible development of chronic breathing disorders, including asthma.	
Toxicity Measure:	Inhalation LC_{50}: mice, 12.6 ppm for 3 hours; hamster, 35.5 ppm for 3 hours	
Symptoms:	Irritancy of Ozone:	Yes
	Sensitivity to Ozone:	No
	Reproductive Toxicity:	Not Proven
	Teratogenicity:	Not Proven
	Toxicologically Synergistic Products:	Increased susceptibility to allergens, pathogens, irritants
Carcinogenicity:	No (NTP, IARC, OSHA)	

12. ECOLOGICAL INFORMATION

Ozone can have an adverse effect on plant life at high concentrations, or at low concentrations for long periods of time. The immediate surrounding area may also be adversely affected by an ozone release. Discharge of ozone in water solution may be harmful to aquatic life. Due to natural decomposition, bioaccumulation will not occur, and the area affected will be limited.

13. DISPOSAL CONSIDERATIONS

Off gassing of ozone should be through an ozone destruct unit, which breaks down ozone into oxygen before release into the atmosphere.

14. TRANSPORT INFORMATION

Not applicable as ozone is unstable and either reacts or decomposes, and must be generated at the location and time of use.

15. REGULATORY INFORMATION

SARA HAZARD CLASSES:
Sudden Release of Pressure Hazard
Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA TITLE III –SECTION 302, Emergency Planning:
Ozone is listed as an Extremely Hazardous Substance (EHS) under Section 302 of SARA Title III with a Threshold Planning Quantity (TPQ) of 100 pounds. Facilities with TPQ of 100 pounds are required to set a one-time reporting requirement.

SARA TITLE III –SECTION 304, Emergency Release Notification:
In the event of an accidental chemical release that exceeds minimal Reportable Quantity (RQ), facilities releasing ozone in quantities equal or greater than the RQ of 100 pounds are subject to reporting to the SERCs, LPECs, fire department for all affected region and the National Response Center.

SARA TITLE III –SECTION 313, Toxic Chemical Release Inventory:
Facilities with 10 or more employees that use ozone, a toxic chemical with TPQ above 100 pounds, are required to report annually on use, release and disposal of ozone.

16.OTHER INFORMATION

Disclaimer: The information in this SDS was written based on the best knowledge and experience currently available. Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases, data is not available and is so stated. Since conditions of actual product use are beyond the control of Pacific Ozone Technology, it is assumed that the user of this material has been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and Pacific Ozone Technology will not be liable for any losses, injuries or consequential damages which may result from the use or reliance on any information contained in this SDS.

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