

OZONE MATERIAL SAFETY DATA SHEET (MSDS)

Product: Ozone

1. Product Identification

Synonyms:	Triatomic oxygen
CAS No.:	10028-15-6
Molecular Weight:	48.0
Chemical Formula:	O ₃

2. Composition/Information on Ingredients

Ingredient	Ozone gas
CAS No	10028-15-6
Percent	1 - 15%
Hazardous	Yes

3. Hazards Identification

Emergency Overview

Highly reactive, can explode on contact with organic substances, especially strong reducing agents.

Ozone is a powerful oxidizing agent and oxidation with ozone evolves more heat and usually starts at a lower temperature than oxidation with oxygen. It reacts with non-saturated organic compounds to produce ozonides, which are unstable and may decompose with explosive violence. Ozone is an unstable gas which, at normal temperatures, decomposes to diatomic oxygen. At elevated temperatures and in the presence of certain catalysts such as hydrogen, iron, copper and chromium, this decomposition may be explosive.

Potential Health Effects

Inhalation: Causes dryness of the mouth, coughing, and irritates the nose, throat, and chest. May cause difficulty in breathing, headache, and fatigue. The characteristic sharp, irritating odor is readily detectable at low concentrations (0.01 to 0.05 ppm).

Skin: Absorption through intact skin is not expected.

Eye Contact: Ozone is an irritant to the eyes causing pain, lacrimation, and general inflammation.

Ingestion: Not a route of exposure.

Aggravation of Pre-existing Conditions:

Ozone may increase sensitivity to bronchoconstrictors including allergens.

4. First Aid Measures

Inhalation:

Remove to fresh air; if breathing is difficult a trained person should administer oxygen. If respiration stops, give mouth-to-mouth resuscitation. Get medical attention.

Ingestion:

Not an expected route of exposure.

Skin Contact:

Wash skin thoroughly with soap and water.

Eye Contact:

Immediately flush eyes with large amounts of water for at least 15 minutes, while forcibly holding eyelids apart to ensure flushing of the entire eye surface. If irritation, pain, or other symptoms persist seek medical attention.

Acute:

May cause irritation of skin, eyes, and mucous membranes of the respiratory tract. Drowsiness, dizziness, headache, and fatigue have been associated with exposure.

Chronic:

Long term health effects are not expected from exposures to ozone. A partial tolerance appears to develop with repeated exposures.

5. Fire Fighting Measures

Flash Point:

N/D

Auto ignition Temperature:

N/D

Flammable Limits in air, % by volume - Upper: N/D **Lower:** N/D

Extinguishing Media:

Use extinguishing media suitable for surrounding fires.

Unusual Fire and Explosion Hazard: None expected. Since ozone is highly unstable and decomposes under all conditions and is not encountered except at very small levels in the immediate vicinity where formed.

6. Accidental Release Measures

Evacuate danger area. Open doors and windows to allow area to ventilate. Consult an expert.

Ozone should be contained within a chemically compatible piping system.

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8. Exposure Controls/Personal Protection

Exposure Guidelines:

OSHA PEL: 0.10-ppm PEL/TLV

Ventilation Requirements:

General exhaust recommended. Avoid working with ozone generating equipment in enclosed spaces.

Specific Personal Protective Equipment

Respiratory:

Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations.

Only appropriate respirators shall be provided and used when the use of respirators is the only means of controlling exposure for routine operations, or during an emergency. (Refer to Table 1 of ANSUI/ASTM E591-77 for appropriate respirator selection).

Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.

Eye: Not necessary

Gloves: Not necessary.

Other Clothing and Equipment: Not necessary.

9. Physical and Chemical Properties

Specific Gravity (H₂O=1):

2.144 g/L

Vapor Pressure:

N/A

Molecular Weight:

48.00

Evaporation Rate (BuAc=1):

N/A

Boiling Point:

-111.9°C

Vapor Density (Air=1):

1.7

Melting Point:

-192.7°C

Solubility in H₂O % by Weight:

0.49

Appearance and Odor:

Colorless to bluish gas with a characteristic pungent odor similar to the smell after strong lightning storms.

10. Stability and Reactivity

Stability:

Ozone spontaneously decomposes under all ordinary conditions, so that it is not encountered except in the immediate vicinity of where it was formed. The decomposition is speeded by solid surfaces and by many chemical substances.

Hazardous Decomposition Products:

Free radical oxygen. O[•])

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Ozone is a powerful oxidizing agent and reacts with all oxidizable materials, both organic and inorganic. Some reactions are highly explosive. Alkenes, benzene and other aromatic compounds, rubber, dicyanogen, bromine diethyl ether, dinitrogen tetroxide, nitrogen trichloride, hydrogen bromide, and tetrafluorohydrazine.

11. Toxicological Information

Ozone is extremely irritating to the upper and lower respiratory tract. The characteristic odor is readily detectable at low concentrations (0.02 ppm to 0.05 ppm). Ozone produces local irritation of the eyes and mucous membranes and may cause pulmonary edema at high exposure. Systematically, ozone has been reported to mimic the effects of ionizing radiation, and may cause damage to chromosomal structures. A partial tolerance appears to develop with repeated exposures. Although most effects are acute, the possibility of chronic lung impairment should be considered, based upon animal experimentation.

12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

No information found.

13. Disposal Considerations

Do not dispose of ozone off gas to atmosphere without properly designed off gas destruct unit. State and local disposal regulations may differ from federal disposal regulations.

14. Transport Information

Proper Shipping Name:

N/A

Hazard Class:

N/A

Identification Number:

N/A

Packing Group:

N/A

15. Regulatory Information

SARA TITLE III:

N/A

TSCA:

The ingredients of this product are on the TSCA Inventory List.

OSHA:

Nonhazardous according to definitions of health hazard and physical hazard provided in the Hazard Communication Standard (29 CFR 1910.1200)

16. Other Information

Label Hazard Warning:

HIGHLY REACTIVE. OZONE GAS AFFECTS THE RESPIRATORY SYSTEM.

Label Precautions:

Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing. Avoid breathing. Use with adequate ventilation.

Label First Aid:

If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.

Product Use:

Laboratory Reagent.

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