1. PRODUCT IDENTIFICATION

Product Name: OZONE

Common Names/Synonyms: Triatomic Oxygen, Trioxgen,

Ozone Generator Manufacturer/Supplier
Ozone Solutions, Inc. www.ozonesolutions.com
451 Black Forest Rd. tech@ozonesolutions.com
Hull, IA 51239
712-439-6880

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 purposes of odor abatement, oxidation of organic compounds, or antimicrobial intervention, in a variety of applications.

2. HAZARD IDENTIFICATION

GHS Classifications:

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

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 Classifications (Workplace Hazardous Materials Information System, Canada): C, D1A, D2A, D2B, F
Source: CCOHS CHEMINFO Record Number 774

3. COMPOSITION

Chemical name: Ozone
Common names: Triatomic oxygen, trioxgen
Chemical Formula: O3
CAS Registry Number: 10028-15-6

4. FIRST AID MEASURES

Route of Entry Symptoms First Aid
Skin Contact YES Irritation Rinse with water
Skin Absorption NO NA NA
Eye Contact YES Irritation Rinse with water, remove contacts
Ingestion NO NA NA
Inhalation YES Headache, cough, heavy chest, shortness of breath
Remove to fresh air, provide oxygen therapy as needed

For severe cases, or if symptoms don’t improve, seek medical help.

5. FIRE FIGHTING MEASURES

Ozone itself is not flammable. As a strong oxidant it may accelerate, even initiate, combustion, or cause explosions. Use whatever extinguishing agents are indicated for the burning materials.

6. ACCIDENTAL RELEASE MEASURES

Turn off the ozone generator, and ventilate the area. Evacuate until ozone levels subside to a safe level (<0.1 ppm).

7. HANDLING AND STORAGE

Ozone must be contained within ozone-resistant tubing and pipes from the generation point to the application point.

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 hours: 0.2 ppm
Immediately Dangerous to Life or Health (IDLH) 5 ppm

Respiratory Protection: Use full face 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>48.0</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear at low concentration, blue at higher concentration</td>
</tr>
<tr>
<td>Odor</td>
<td>Distinct pungent odor</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>0.02 to 0.05 ppm; exposure desensitizes</td>
</tr>
<tr>
<td>Melting point</td>
<td>-193°C/-315°F</td>
</tr>
<tr>
<td>Boiling point</td>
<td>-112°C/-169°F</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>&gt; 1 atm</td>
</tr>
<tr>
<td>Vapor density</td>
<td>1.6 (air = 1)</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>570 mg/L @ 20°C &amp; 100% O3; 0.64 @0°C</td>
</tr>
<tr>
<td>pH</td>
<td>NA</td>
</tr>
<tr>
<td>Physical state</td>
<td>NA</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>NA</td>
</tr>
<tr>
<td>Flammability</td>
<td>NA</td>
</tr>
<tr>
<td>Viscosity</td>
<td>NA</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Ozone is highly unstable and highly reactive. Avoid contact with oxidizable substances. Ozone will readily react and spontaneously decompose under normal ambient temperatures.

11. TOXICOLOGICAL INFORMATION

Likely routes of exposure: inhalation, eyes, skin exposure.

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.

LC50: mice, 12.6 ppm for 3 hours; hamsters, 33.5 ppm for 3 hours

Irritancy of Ozone: YES
Sensitization to Ozone: NO
Carcinogenicity (NTP, IARC, OSHA): NO
Reproductive Toxicity: Teratogenicity, Mutagenicity: Not Proven
Toxicologically Synergistic Products: Increased susceptibility to allergens, pathogens, irritants

12. ECOLOGICAL INFORMATION

The immediate surrounding area may be adversely affected by an ozone release, particularly plant life. 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 ozone down to 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 Title III Section 302 EHS TPQ: 100 lbs.
SARA Title III Section 304, EHS RQ: 100 lbs.
SARA Title III Section 313: > 10,000 lbs. used/year.
Source: EPA List of Lists

16. OTHER INFORMATION

Half-life of ozone in water at 20°C = 20 min; in dry still air at 24°C = 25 hr; decreases significantly with increase in humidity, presence of contaminants, air movement, and/or increase in temperature.

Preparer: Tim McConnel, Ozone Solutions
Date of Preparation: 5/1/2012

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