

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product form : Mixture  
 Product name : Ozone (4.80% - 9.99%) in Oxygen  
 Product code : SG-2002-02449

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Test gas/Calibration gas.

#### 1.3. Details of the supplier of the safety data sheet

Air Liquide  
 2700 Post Oak Boulevard  
 Houston, TX 77056 - USA  
 T 1-800-819-1704  
[www.us.airliquide.com](http://www.us.airliquide.com)

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

|                               |      |
|-------------------------------|------|
| Ox. Gas 1                     | H270 |
| Compressed gas                | H280 |
| Acute Tox. 1 (Inhalation:gas) | H330 |
| Muta. 2                       | H341 |
| STOT SE 3                     | H335 |
| STOT RE 2                     | H373 |

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H270 - May cause or intensify fire; oxidizer  
 H280 - Contains gas under pressure; may explode if heated  
 H330 - Fatal if inhaled  
 H335 - May cause respiratory irritation  
 H341 - Suspected of causing genetic defects (Inhalation)  
 H373 - May cause damage to organs (lung, bronchial tubes) through prolonged or repeated exposure (Inhalation)

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood  
 P220 - Keep/Store away from combustible materials, clothing  
 P244 - Keep reduction valves/valves and fittings free from oil and grease  
 P260 - Do not breathe gas  
 P271 - Use only outdoors or in a well-ventilated area  
 P280 - Wear eye protection, face protection, protective gloves, protective clothing  
 P284 - Wear respiratory protection. Consult respiratory device supplier's product information for the selection of the appropriate device.  
 P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
 P307+P311 - If exposed: Call a poison center/doctor  
 P403 - Store in a well-ventilated place  
 P405 - Store locked up  
 P501 - Dispose of contents/container in accordance with local/regional/national/international regulations  
 CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

CGA-PG05 - Use a back flow preventive device in the piping  
CGA-PG06 - Close valve after each use and when empty  
CGA-PG10 - Use only with equipment rated for cylinder pressure  
CGA-PG14 - Approach suspected leak area with caution  
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug  
CGA-PG20 - Use only with equipment of compatible materials of construction  
CGA-PG21 - Open valve slowly  
CGA-PG22 - Use only with equipment cleaned for oxygen service

### 2.3. Other hazards

No additional information available

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

| Name   | Product identifier  | %            | GHS-US classification   |
|--------|---------------------|--------------|---|
| Oxygen | (CAS No) 7782-44-7  | 90.01 - 95.2 | Ox. Gas 1, H270<br>Compressed gas, H280   |
| Ozone  | (CAS No) 10028-15-6 | 4.8 - 9.99   | Ox. Gas 1, H270<br>Acute Tox. 1 (Inhalation:gas),<br>H330<br>Skin Irrit. 2, H315<br>Eye Irrit. 2A, H319<br>Muta. 2, H341<br>STOT SE 3, H335<br>STOT RE 2, H373<br>Aquatic Acute 1, H400 |

Full text of H-phrases: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration with bag or mask if breathing stopped. Get immediate medical advice/attention.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Fatal if inhaled. May cause respiratory irritation.

Symptoms/injuries after skin contact : Adverse effects not expected from this product.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : Suspected of causing genetic defects. May cause damage to organs (lung, bronchial tubes) through prolonged or repeated exposure (Inhalation).

### 4.3. Indication of any immediate medical attention and special treatment needed

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water jet to extinguish.

### 5.2. Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Reactivity : None known.

### 5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

#### 6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

#### 6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area.

### 6.2. Environmental precautions

Try to stop release if safe to do so.

### 6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if safe to do so.

Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

### 6.4. Reference to other sections

See also Sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Close valve after each use and when empty.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Hygiene measures : Do not eat, drink or smoke when using this product.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area. Store locked up.

Incompatible products : None known.

Incompatible materials : Flammable materials. Combustible materials. Reducing agents.

### 7.3. Specific end use(s)

See Section 1.2.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

| Ozone (4.80% - 9.99%) in Oxygen |                |
|---------------------------------|----------------|
| ACGIH                           | Not applicable |
| OSHA                            | Not applicable |
| Ozone (10028-15-6)              |                |
| ACGIH                           | Not applicable |
| OSHA                            | Not applicable |

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### Oxygen (7782-44-7)

|       |                |
|-------|----------------|
| ACGIH | Not applicable |
| OSHA  | Not applicable |

### 8.2. Exposure controls

|                                  |   |
|----------------------------------|---|
| Appropriate engineering controls | : Ensure exposure is below occupational exposure limits. Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Alarm detectors should be used when toxic gases may be released.                         |
| Hand protection                  | : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.   |
| Eye protection                   | : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.  |
| Skin and body protection         | : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.   |
| Respiratory protection           | : Wear a respirator when performing non-routine tasks not limited to line breaking or sampling. Wear a respirator during routine operations if determined to be necessary during a process-specific review. Consult respirator suppliers' product information or their representatives for the selection of the appropriate respirator. |
| Thermal hazard protection        | : None necessary during normal and routine operations.  |
| Environmental exposure controls  | : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.   |
| Other information                | : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.  |

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

|   |   |
|---|---|
| Physical state                              | : Gas   |
| Appearance                                  | : Clear, colorless gas.   |
| Color                                       | : Colorless   |
| Odor  | : Irritating/pungent odour  |
| Odor threshold                              | : No data available   |
| pH  | : No data available   |
| Melting point                               | : No data available   |
| Freezing point                              | : No data available   |
| Boiling point                               | : No data available   |
| Flash point                                 | : Not applicable - not flammable  |
| Relative evaporation rate (butyl acetate=1) | : No data available   |
| Flammability (solid, gas)                   | : See Section 2.1 and 2.2   |
| Explosion limits                            | : Not applicable - not flammable  |
| Explosive properties                        | : Not applicable - not flammable.   |
| Oxidizing properties                        | : Not combustible but enhances combustion of other substances. May cause or intensify fire; oxidizer. |
| Vapor pressure                              | : No data available   |
| Relative density                            | : No data available   |
| Relative vapor density at 20 °C             | : No data available   |
| Molecular mass                              | : Not applicable for gas-mixtures.  |
| Relative gas density                        | : Heavier than air  |
| Solubility                                  | : No data available   |
| Log Pow                                     | : No data available   |
| Log Kow                                     | : No data available   |
| Auto-ignition temperature                   | : No data available   |
| Decomposition temperature                   | : No data available   |
| Viscosity                                   | : No data available   |
| Viscosity, kinematic                        | : No data available   |
| Viscosity, dynamic                          | : No data available   |

### 9.2. Other information

|                        |  |
|------------------------|--|
| Additional information | : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. |
|------------------------|--|

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

None known.

#### 10.2. Chemical stability

Decomposes at room temperature.

#### 10.3. Possibility of hazardous reactions

May react violently with reducing agents. Can form explosive mixtures with flammable materials.

#### 10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

#### 10.5. Incompatible materials

Combustible materials. Flammable materials. Reducing agents.

#### 10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: Fatal if inhaled.

| Ozone (4.80% - 9.99%) in Oxygen |                |
|---------------------------------|----------------|
| ATE US (gases)                  | 48.048 ppmV/4h |
| Ozone (10028-15-6)              |                |
| LC50 inhalation rat (ppm)       | 4.8 ppm/4h     |
| ATE US (gases)                  | 4.800 ppmV/4h  |
| Oxygen (7782-44-7)              |                |
| LC50 inhalation rat (ppm)       | 800000 ppm/4h  |

|  |   |
|--|---|
| Skin corrosion/irritation                          | : Not classified  |
| Serious eye damage/irritation                      | : Not classified  |
| Respiratory or skin sensitization                  | : Not classified  |
| Germ cell mutagenicity                             | : Suspected of causing genetic defects (Inhalation).  |
| Carcinogenicity                                    | : Not classified  |
| Reproductive toxicity                              | : Not classified  |
| Specific target organ toxicity (single exposure)   | : May cause respiratory irritation.   |
| Specific target organ toxicity (repeated exposure) | : May cause damage to organs (lung, bronchial tubes) through prolonged or repeated exposure (Inhalation).                                       |
| Aspiration hazard                                  | : Not classified  |
| Symptoms/injuries after inhalation                 | : Fatal if inhaled. May cause respiratory irritation.   |
| Symptoms/injuries after skin contact               | : Adverse effects not expected from this product.   |
| Symptoms/injuries after eye contact                | : Adverse effects not expected from this product.   |
| Symptoms/injuries after ingestion                  | : Ingestion is not considered a potential route of exposure.  |
| Symptoms/injuries upon intravenous administration  | : Not known.  |
| Chronic symptoms                                   | : Suspected of causing genetic defects. May cause damage to organs (lung, bronchial tubes) through prolonged or repeated exposure (Inhalation). |

### SECTION 12: Ecological information

#### 12.1. Toxicity

No additional information available

#### 12.2. Persistence and degradability

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| Oxygen (7782-44-7)            |  |
|-------------------------------|--|
| Persistence and degradability | No ecological damage caused by this product. |

### 12.3. Bioaccumulative potential

| Oxygen (7782-44-7)        |  |
|---------------------------|--|
| Log Pow                   | Not applicable for inorganic gases.          |
| Bioaccumulative potential | No ecological damage caused by this product. |

### 12.4. Mobility in soil

| Oxygen (7782-44-7) |  |
|--------------------|--|
| Ecology - soil     | No ecological damage caused by this product. |

### 12.5. Other adverse effects

- Effect on ozone layer : No known effects from this product.
- Effect on the global warming : No known ecological damage caused by this product.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

- Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.
- Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at [www.cganet.com](http://www.cganet.com) for more guidance on suitable disposal methods.

## SECTION 14: Transport information

### Department of Transportation (DOT)

- In accordance with DOT
- Transport document description : UN3303 Compressed gas, toxic, oxidizing, n.o.s. (Ozone, Oxygen) Inhalation Hazard Zone A
- UN-No.(DOT) : UN3303
- Proper Shipping Name (DOT) : Compressed gas, toxic, oxidizing, n.o.s.  
Inhalation Hazard Zone A
- Hazard labels (DOT) : 2.3 - Poison gas  
5.1 - Oxidizer



- DOT Packaging Non Bulk (49 CFR 173.xxx) : 192
- DOT Packaging Bulk (49 CFR 173.xxx) : 245
- DOT Symbols : G - Identifies PSN requiring a technical name
- DOT Special Provisions (49 CFR 172.102) : 1 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone A (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.
- DOT Packaging Exceptions (49 CFR 173.xxx) : None
- DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
- DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden
- DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
- DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

### Additional information

- Other information : No supplementary information available.

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### ADR

Transport document description : UN 3303, 2.3 (5.1), (C/D)  
Class (ADR) : 2 - Gases  
Hazard identification number (Kemler No.) : 265  
Classification code (ADR) : 1TO  
Hazard labels (ADR) : 2.3 - Toxic gases  
5.1 - Oxidizer



Orange plates :



Tunnel restriction code (ADR) : C/D  
Limited quantities (ADR) : 0  
Excepted quantities (ADR) : E0

### Transport by sea

UN-No. (IMDG) : 3303  
Proper Shipping Name (IMDG) : COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.  
Class (IMDG) : 2 - Gases

### Air transport

UN-No. (IATA) : 3303  
Proper Shipping Name (IATA) : COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.  
Class (IATA) : 2

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### Oxygen (7782-44-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### 15.2. International regulations

#### CANADA

No additional information available

#### Oxygen (7782-44-7)

Listed on the Canadian DSL (Domestic Substances List)

|                      |  |
|----------------------|--|
| WHMIS Classification | Class A - Compressed Gas<br>Class C - Oxidizing Material |
|----------------------|--|

#### EU-Regulations

No additional information available

#### Oxygen (7782-44-7)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

#### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

No additional information available

#### National regulations

# Ozone (4.80% - 9.99%) in Oxygen

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### Oxygen (7782-44-7)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

### 15.3. US State regulations

### Oxygen (7782-44-7)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

- Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.
- Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

|                               |   |
|-------------------------------|---|
| Acute Tox. 1 (Inhalation:gas) | Acute toxicity (inhalation:gas) Category 1                        |
| Aquatic Acute 1               | Hazardous to the aquatic environment - Acute Hazard Category 1    |
| Compressed gas                | Gases under pressure Compressed gas                               |
| Eye Irrit. 2A                 | Serious eye damage/eye irritation Category 2A                     |
| Muta. 2                       | Germ cell mutagenicity Category 2                                 |
| Ox. Gas 1                     | Oxidizing gases Category 1  |
| Skin Irrit. 2                 | Skin corrosion/irritation Category 2                              |
| STOT RE 2                     | Specific target organ toxicity (repeated exposure) Category 2     |
| STOT SE 3                     | Specific target organ toxicity (single exposure) Category 3       |
| H270                          | May cause or intensify fire; oxidizer                             |
| H280                          | Contains gas under pressure; may explode if heated                |
| H315                          | Causes skin irritation  |
| H319                          | Causes serious eye irritation                                     |
| H330                          | Fatal if inhaled  |
| H335                          | May cause respiratory irritation                                  |
| H341                          | Suspected of causing genetic defects                              |
| H373                          | May cause damage to organs through prolonged or repeated exposure |
| H400                          | Very toxic to aquatic life  |

SDS US (GHS HazCom 2012)

*This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.*