# OXYGEN, GAS

## Material Safety Data Sheet

## 1. PRODUCT AND COMPANY IDENTIFICATION

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|---|---|
| **Product Name** | OXYGEN, GAS |
| **Product Code(s)** | G-1, 1024 |
| **UN-No** | UN1072 |
| **Recommended Use** | Compressed gas. |
| **Synonyms** | LASER Oxygen; Oxygen, Compressed |
| **Supplier Address** | Linde LLC<br>575 Mountain Ave.<br>Murray Hill, NJ 07974<br>Phone: 908-464-8100<br>www.lindeus.com<br><br>Linde Gas Puerto Rico, Inc.<br>Las Palmas Village<br>Road No. 869, Street No. 7<br>Catano, Puerto Rico 00962<br>Phone: 787-641-7445<br>www.pr.lindegas.com<br><br>Linde Canada Limited<br>5860 Chedworth Way<br>Mississauga, Ontario L5R 0A2<br>Phone: 905-501-1700<br>www.lindecanada.com<br><br>For additional product information contact your local customer service. |
| **Chemical Emergency Phone Number** | Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US |

## 2. HAZARDS IDENTIFICATION

WARNING!

### Emergency Overview

Oxidizer
Contact with combustible material may cause fire
Contents under pressure
Keep at temperatures below 52°C / 125°F

**Appearance** Colorless **Physical State** Compressed gas. **Odor** Odorless

**OSHA Regulatory Status** This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Potential Health Effects**

**Principle Routes of Exposure** Inhalation.

Acute Toxicity

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| **Inhalation** | Oxygen is not acutely toxic under normal pressure. Oxygen is more toxic when inhaled at elevated pressures. Depending upon pressure and duration of exposure, pure oxygen at elevated pressures may cause cramps, dizziness, difficulty breathing, convulsions, edema and death. |
| **Eyes** | None known. Contact with rapidly expanding gas near the point of release may cause frostbite. |
| **Skin** | None known. Contact with rapidly expanding gas near the point of release may cause frostbite. |
| **Skin Absorption Hazard** | No known hazard in contact with skin. |
| **Ingestion** | None known. |
| **Chronic Effects** | Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation. |
| **Aggravated Medical Conditions** | Chronic obstructive pulmonary disease. |
| **Environmental Hazard** | See Section 12 for additional Ecological Information. |

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No | Volume % | Chemical Formula |
|---|---|---|---|
| Oxygen | 7782-44-7 | >99 | $O_2$ |

## 4. FIRST AID MEASURES

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| **Eye Contact** | None under normal use. Get medical attention if symptoms occur. |
| **Skin Contact** | None under normal use. Get medical attention if symptoms occur. |
| **Inhalation** | Move victim to fresh air. Seek immediate medical attention/advice. |
| **Ingestion** | None under normal use. Get medical attention if symptoms occur. |
| **Notes to Physician** | Treat symptomatically. |

## 5. FIRE-FIGHTING MEASURES

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| **Flammable Properties** | Oxidizer. May vigorously accelerate combustion. |
| **Suitable Extinguishing Media** | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |

Explosion Data

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| **Sensitivity to Mechanical Impact** | None. |
| **Sensitivity to Static Discharge** | None. |
| **Specific Hazards Arising from the Chemical** | May ignite combustibles (wood paper, oil, clothing, etc.) High oxygen concentrations vigorously accelerate combustion. Cylinders may rupture under extreme heat. Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists. |

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| Protective Equipment and Precautions for Firefighters | As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. |

## 6. ACCIDENTAL RELEASE MEASURES

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|---|---|
| Personal Precautions | Ensure adequate ventilation. Monitor oxygen level. |
| Environmental Precautions | Prevent spreading of vapors through sewers, ventilation systems and confined areas. |
| Methods for Containment | Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location. |
| Methods for Cleaning Up | Return cylinder to Linde or an authorized distributor. |

## 7. HANDLING AND STORAGE

**Handling**

Dry product is non-corrosive and may be used with all materials of construction. Moisture causes metal oxides which are formed with air to be hydrated so that they include volume and lose their protective role (rust formation). Concentrations of $SO_2$, $Cl_2$, salt, etc. in the moisture enhances the rusting of metals in air. Carbon steels and low alloy steels are acceptable for use at lower pressures. For high pressure applications stainless steels are acceptable as are copper and its alloys, nickel and its alloys, brass bronze, silicon alloys, Monel®, Inconel®, and beryllium. Lead and silver or lead tin alloys are good gasket materials. Teflon®, Teflon® composites, or Kel-F® are preferred non-metallic gasket materials.

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since they generally conatin flammable lubricants. Equipment able to use oxygen must be "cleaned for oxygen service". Check with the equipment supplier to verify oxygen compatibility for the service conditions.

Stationary customer site vessels should be operated in accordance with the manufacturer's and Linde's instruction. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operations problem with the vessel, contact the closest Linde location immediately for assistance. "NO SMOKING" signs should be posted in storage and use areas. Containers of liquid oxygen should be separated from flammable gas containers by a minimum distance of 20 ft., or by a barrier of non-combustible material at least 5 ft. high having a fire resistance rating of 1/2 hour.

Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Never insert an object (e.g. wrench, screwdriver, pry bar,etc.) into valve cap openings. Doing so may damage valve, causing leak to occur.

Use an adjustable strap wrench to remove over-tight or rusted caps. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

For additional recommendations, consult Compressed Gas Association's Pamphlets SB-7, G-4.3, G-4.1, G-4.4, P-2.5, G-4.9, P-14, and SB-2.

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| Storage | Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregrated. Use a "first in-first out" inventory system to prevent full cylinders from being stored or excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers. |

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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| Exposure Guidelines | This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies. |
| Engineering Measures | Showers. Eyewash stations. Ventilation systems. |
| Ventilation | Use local exhaust in combination with general ventilation as necessary to keep oxygen concentrations below 23.5%. |

Personal Protective Equipment

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|---|---|
| Eye/Face Protection | Wear protective eyewear (safety glasses). |
| Skin and Body Protection | Work gloves and safety shoes are recommended when handling cylinders. Gloves must be clean and free from grease or oil. |
| Respiratory Protection | |
| General Use | No special protective equipment required. |
| Hygiene Measures | Handle in accordance with good industrial hygiene and safety practice. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

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|---|---|---|---|
| Appearance | Colorless. | Odor | Odorless. |
| Odor Threshold | No information available | Physical State | Compressed gas |
| Flash Point | No information available. | Autoignition Temperature | No information available |
| Decomposition Temperature | No information available | Boiling Point/Range | -182.9°C / -297.3°F |
| Freezing Point | -218.8°C / -361.8°F | Molecular Weight | 32.00 |
| Water Solubility | Slightly soluble | Evaporation Rate | No information available |
| Vapor Pressure | Above critical temp. | Vapor Density | 1.326 kg/m³ (0.083 lb/ft³) @21.1°C |
| VOC Content(%) | Not applicable | Partition Coefficient: n-octanol/water | Log P -0.65 |
| Specific Vol. @ 21.1°C & 1 atm | 12.1 ft³/lb | Critical Pressure | 731.4 psia |
| Critical Temperature | -118.57°C / -215.4°F | Flammability Limits in Air | |
| | | Upper | Not applicable |
| | | Lower | Not applicable |

## 10. STABILITY AND REACTIVITY

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|---|---|
| Stability | Stable. |

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| **Incompatible Products** | Combustible materials. Organic material. Reducing agents. |
| **Conditions to Avoid** | Keep away from open flames, hot surfaces and sources of ignition. |
| **Hazardous Decomposition Products** | None known. |
| **Hazardous Polymerization** | Hazardous polymerization does not occur. |

## 11. TOXICOLOGICAL INFORMATION

Acute Toxicity

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|---|---|
| **LD50 Oral:** | No information available. |
| **LD50 Dermal:** | No information available. |
| **LC50 Inhalation:** | No information available. |
| **Inhalation** | Human volunteers which inhaled 90-95% oxygen through a face mask for 6 hours showed signs of tracheal irritation and fatigue. Other symptoms (which may have been caused by placing a tube into the trachea during the experiment) included: sinusitis, conjunctivitis, fever, and symptoms of acute bronchitis.<br><br>Poisoning began in dogs 36 hours after inhalation of pure oxygen at atmospheric pressure. Distress was seen within 48 hours and death within 60 hours. |
| **Eye Contact** | The incompletely developed retinal circulation is more susceptible to toxic levels of oxygen. In premature infants, arterial oxygen tension above 150 mm Hg may cause retrolental fibroplasia. Permanent blindness may occur several months later. One case of severe retinal damage in an adult was reported. An individual suffering from myasthenia gravis developed irreversible retinal atrophy after breathing 80% oxygen for 150 days. |
| **Repeated Dose Toxicity** | No information available. |

Chronic Toxicity

| | |
|---|---|
| **Chronic Toxicity** | Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation. |
| **Carcinogenicity** | Contains no ingredient listed as a carcinogen. |

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|---|---|
| **Irritation** | No information available. |
| **Sensitization** | No information available. |
| **Reproductive Toxicity** | No information available. |
| **Developmental Toxicity** | No information available. |
| **Synergistic Materials** | None known. |
| **Target Organ Effects** | None known. |

## 12. ECOLOGICAL INFORMATION

Ecotoxicity

Will not bioconcentrate.

**Ozone depletion potential; ODP; (R-11 = 1):** Does not contain ozone depleting chemical (40 CFR Part 82).

## 13. DISPOSAL CONSIDERATIONS

**Waste Disposal Methods** Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

## 14. TRANSPORT INFORMATION

DOT

| | |
|---|---|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| Subsidiary Class | 5.1 |
| UN-No | UN1072 |
| Description | UN1072,Oxygen, compressed,2.2,(5.1) |

TDG

| | |
|---|---|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| Subsidiary Class | (5.1) |
| UN-No | UN1072 |
| Description | UN1072,OXYGEN, COMPRESSED,2.2(5.1) |

MEX

| | |
|---|---|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| Subsidiary Class | 5.1 |
| UN-No | UN1072 |
| Description | UN1072 Oxygen, compressed,2.2 |

IATA

| | |
|---|---|
| UN-No | UN1072 |
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| Subsidiary Class | 5.1 |
| ERG Code | 2X |
| Description | UN1072,Oxygen, compressed,2.2(5.1) |
| Maximum Quantity for Passenger | 75 kg |
| Maximum Quantity for Cargo Only | 150 kg |
| Limited Quantity | No information available. |

IMDG/IMO

| | |
|---|---|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |

| | |
|---|---|
| Subsidiary Class | 5.1 |
| UN-No | UN1072 |
| EmS No. | F-C, S-W |
| Description | UN1072, Oxygen, compressed,2.2(5.1) |

ADR

| | |
|---|---|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| UN-No | UN1072 |
| Classification Code | 1O |
| Description | UN1072 Oxygen, compressed,2.2, |
| ADR/RID-Labels | 5.1 |

## 15. REGULATORY INFORMATION

International Inventories

| | |
|---|---|
| TSCA | Complies |
| DSL | Complies |
| EINECS/ELINCS | Complies |

Legend

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

| | |
|---|---|
| Acute Health Hazard | No |
| Chronic Health Hazard | No |
| Fire Hazard | Yes |
| Sudden Release of Pressure Hazard | Yes |
| Reactive Hazard | No |

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs
This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68.
This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CERCLA/SARA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

| Chemical Name | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|
| Oxygen | X | X | X | | X |

International Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
A Compressed gases
C Oxidizing materials

## 16. OTHER INFORMATION

| | |
|---|---|
| **Prepared By** | Product Stewardship<br>23 British American Blvd.<br>Latham, NY 12110<br>1-800-572-6501 |
| **Issuing Date** | 05-Mar-2010 |
| **Revision Date** | |
| **Revision Number** | 0 |
| **Revision Note** | Initial Release. |

| | | | | |
|---|---|---|---|---|
| NFPA | **Health Hazard** 0 | **Flammability** 0 | **Stability** 0 | **Physical and Chemical Hazards** OX |
| HMIS | **Health Hazard** 0 | **Flammability** 0 | **Physical Hazard** 3 | **Personal Protection** - |

**Note:** Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.



End of Safety Data Sheet