



Odorox, Odourized Oxygen

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Odorox, Odourized Oxygen
Product Code(s)	027-03-0006
UN-Number	UN3156
Recommended Use	Industrial use.
Supplier Address*	Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com
	Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com
	Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com
	* May include subsidiaries or affiliate companies/divisions.
	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

Accelerates combustion and increases risk of fire.

Irritating to eyes, respiratory system and skin

Contents under pressure

Keep at temperatures below 52°C / 125°F

Appearance Colorless

Physical State Compressed gas.

Odor Extremely disagreeable

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. Eye contact. Skin contact.
Acute Toxicity	
Inhalation	Dimethyl sulfide is irritating to the respiratory system.
	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.
	Depending on concentration and duration of exposure to carbon dioxide may cause increased respirations, headache, mild narcotic effects, increased blood pressure and pulse, and asphyxiation. Symptoms of overexposure become more apparent when atmospheric oxygen is decreased to 15-17%.
Eyes	Dimethyl sulfide is irritating to the eyes. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin	Dimethyl sulfide is irritating to the skin. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin Absorption Hazard	No known hazard by skin absorption.
Ingestion	Not an expected route of exposure.
Chronic Effects	Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation. Chronic harmful effects are not known from repeated inhalation of concentrations below PEL/TLV.
Aggravated Medical Conditions	Chronic obstructive pulmonary disease. Respiratory disorders.
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	23-100	O ₂
Carbon dioxide	124-38-9	5-23	CO ₂
Dimethyl sulfide	75-18-3	<5	C ₂ H ₆ S

4. FIRST AID MEASURES

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician if irritation persists.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.
Ingestion	None under normal use. Get medical attention if symptoms occur.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Oxidizer. May vigorously accelerate combustion.
Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Hazardous Combustion Products	Sulfur oxides.
<u>Explosion Data</u>	
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.
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

Personal Precautions	Ensure adequate ventilation.
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.
Other Information	Ventilate the area.

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 contain 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.
	"NO SMOKING" signs should be posted in storage and use areas.

Never attempt to lift a cylinder by its valve protection cap. 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 Pamphlets P-1, P-14, and Safety Bulletin SB-2.

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 segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for 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

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Carbon dioxide 124-38-9	STEL = 30000 ppm TWA: 5000 ppm	TWA: 5000 ppm TWA: 9000 mg/m ³ (vacated) TWA: 10000 ppm (vacated) TWA: 18000 mg/m ³ (vacated) STEL: 30000 ppm (vacated) STEL: 54000 mg/m ³	IDLH: 40000 ppm TWA: 5000 ppm TWA: 9000 mg/m ³ STEL: 54000 mg/m ³ STEL: 30000 ppm
Dimethyl sulfide 75-18-3	TWA: 10 ppm		

Immediately Dangerous to Life or Health. ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits.

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Engineering Measures Showers. Eyewash stations. Ventilation systems.

Ventilation Use ventilation adequate to keep exposures below recommended exposure limits.

Personal Protective Equipment

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	If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.
Emergency Use	Use positive pressure air line respirator or self-contained breathing apparatus for exposure over exposure limits or emergency use. For exposures above IDLH, an additional escape bottle is required.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Product Information

Appearance	Colorless.	Odor	Extremely disagreeable.
Odor Threshold	No information available.	Physical State	Compressed gas
Flash Point	No information available.	Autoignition Temperature	No information available.
Flammability Limits in Air			
Upper	Not applicable		
Lower	Not applicable		

The following information is for the NON-INERT components of this mixture:

Chemical Name	Boiling Point	Melting Point	Molecular Weight	Evaporation Rate	Water Solubility	Vapor Pressure	Vapor Density (Air=1)	Gas Density Kg/m ³ @20°C
Carbon dioxide	56 °C	-56 °C	44.00	-	0.145 g/ml @ 25°C	838 psig (5778 kPa) @ 21.1°C	1.522	1.839
Oxygen	-183 °C	-219 °C	31.99	-	Slightly soluble	Above critical temperature	1.11	1.331
Dimethyl sulfide	38	-98.3 °C	62.13		No information available	398 mmHg @ 20 °C	2.1	

10. STABILITY AND REACTIVITY

Stability	Stable.
Incompatible Products	Combustible materials. Organic material. Reducing agents. Carbon dioxide is incompatible with: Certain reactive metals, hydrides, moist cesium monoxide, or lithium acetylene carbide diaminino may ignite. Passing carbon dioxide over a mixture of sodium peroxide and aluminum or magnesium may explode.
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

Product Information

LD50 Oral:	No information available.
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LD50 Dermal:	No information available.
LC50 Inhalation:	No information available.
Inhalation	Acidosis, adrenal cortical exhaustion, and other metabolic stresses have resulted from prolonged continuous exposure to 1-2% carbon dioxide (10,000 ppm-20,000 ppm). The ACGIH TLV of 5,000 ppm is expected to provide a good margin of safety from asphyxiation and undue metabolic stress provided sufficient oxygen levels are maintained in the air. Increased physical activity, duration of exposure, and decreased oxygen content can affect systemic and respiratory effects resulting from exposure to carbon dioxide.
Repeated Dose Toxicity	No information available.

Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Carbon dioxide			470000 ppm (Rat)
Dimethyl sulfide	535 mg/kg (Rat)		

Chronic Toxicity

Chronic Toxicity	Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation. Chronic harmful effects are not known from repeated inhalation of concentrations below PEL/TLV.
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Carcinogenicity	Contains no ingredient listed as a carcinogen.
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Irritation	Dimethyl sulfide is irritating to eyes, skin and respiratory system.
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Sensitization	No information available.
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Reproductive Toxicity	No information available.
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Developmental Toxicity	No information available.
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Synergistic Materials	None known.
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Target Organ Effects	Central vascular system (CVS). Respiratory system. Eyes. Skin.
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12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated.

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

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Dimethyl sulfide				EC50 48 h: = 23 mg/L (Daphnia pulex)

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.
Contaminated Packaging	Do not re-use empty containers.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN3156
Description	UN3156,Compressed gas, oxidizing, n.o.s. (Dimethyl Sulfide,Oxygen),2.2,(5.1)
Emergency Response Guide Number	122

TDG

Proper Shipping Name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
Subsidiary Class	(5.1)
UN-Number	UN3156
Description	UN3156,COMPRESSED GAS, OXIDIZING, N.O.S. (Dimethyl Sulfide,Oxygen),,2.2(5.1)

MEX

Proper Shipping Name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN3156
Description	UN3156 Compressed gas, oxidizing, n.o.s.(Dimethyl Sulfide,Oxygen),2.2(5.1)

IATA

UN-Number	UN3156
Proper Shipping Name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
Subsidiary Class	5.1
ERG Code	2X
Description	UN3156,Compressed gas, oxidizing, n.o.s.(Dimethyl Sulfide,Oxygen),,2.2(5.1)
Maximum Quantity for Passenger	75 kg
Maximum Quantity for Cargo Only	150 kg
Limited Quantity	Forbidden

IMDG/IMO

Proper Shipping Name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN3156
EmS No.	F-C, S-W
Description	UN3156, Compressed gas, oxidizing, n.o.s.(Dimethyl Sulfide,Oxygen),,2.2(5.1)

ADR

Proper Shipping Name	Compressed gas, oxidizing, n.o.s.
Hazard Class	2.2
UN-Number	UN3156
Classification Code	10
Description	UN3156 Compressed gas, oxidizing, n.o.s.(Dimethyl Sulfide,Oxygen),,2.2(5.1),
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 RegulationsSARA 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	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
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
Carbon dioxide	X	X	X	-	X
Dimethyl sulfide	X	X	X		X
Oxygen	X	X	X	-	X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits
Carbon dioxide	-	Mexico: TWA= 5000 ppm Mexico: TWA= 9000 mg/m ³ Mexico: STEL= 15000 ppm Mexico: STEL= 27000 mg/m ³

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
D2B Toxic materials

**16. OTHER INFORMATION****Prepared By**

Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date

10-Feb-2011

Revision Date**Revision Number**

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Revision Note Initial Release.

<u>NFPA</u>	Health Hazard 2	Flammability 0	Stability 0	Physical and Chemical Hazards 0X
HMIS	Health Hazard 2	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.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

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End of Safety Data Sheet