1. IDENTIFICATION

Product identifier

Product Name
OXYGEN (>23.5%) in CARBON DIOXIDE

Other means of identification

Safety data sheet number
LIND-M0147

UN/ID no.
UN3156

Trade name
MAPAX OC20, MAPAX OC30, CARBOGEN, FOOD FRESH 8

Recommended use of the chemical and restrictions on use

Recommended Use
Industrial and professional use.

Uses advised against
Consumer use

Details of the supplier of the safety data sheet

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.
Road 869, Km 1.8
Barrio Palmas, Catano, PR 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.

Emergency telephone number

Company Phone Number
800-232-4726 (Linde National Operations Center, US)
905-501-0802 (Canada)
CHEMTREC: 1-800-424-9300 (North America) +1-703-527-3887 (International)
2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

| Oxidizing gases                              | Category 1         |
| Gases under pressure                        | Compressed gas     |

Label elements

Signal word
Danger

Hazard Statements
May cause or intensify fire; oxidizer
Contains gas under pressure; may explode if heated
May increase respiration and heart rate

Precautionary Statements - Prevention
Do not handle until all safety precautions have been read and understood
Keep and store away from clothing and other combustible materials
Keep valves and fittings free from grease and oil
Avoid breathing gas
Use and store only outdoors or in a well ventilated place
Use a backflow preventive device in piping
Use only equipment of compatible materials of construction and rated for cylinder pressure
Use only with equipment cleaned for oxygen service
Open valve slowly
Close valve after each use and when empty

Precautionary Statements - Response
In case of fire: Stop leak if safe to do so

Precautionary Statements - Storage
Protect from sunlight when ambient temperature exceeds 52°C/125°F

Hazards not otherwise classified (HNOC)
Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Volume %</th>
<th>Chemical Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>124-38-9</td>
<td>&lt;50</td>
<td>CO₂</td>
</tr>
</tbody>
</table>
Composition covers range of mixtures that fall within the same hazard classifications.

4. FIRST AID MEASURES

Description of first aid measures

General advice
Show this safety data sheet to the doctor in attendance.

Inhalation
Move victim to fresh air. Seek immediate medical attention/advice.

Skin contact
None under normal use. Get medical attention if symptoms occur.

Eye contact
None under normal use. Get medical attention if symptoms occur.

Ingestion
Not an expected route of exposure.

Most important symptoms and effects, both acute and delayed

Symptoms
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%.

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.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific extinguishing methods
Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

Specific hazards arising from the chemical
May cause or intensify fire; oxidizer. Will support and accelerate combustion of combustible materials (wood, paper, oil, debris, etc). Cylinders may rupture under extreme heat.

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, protective equipment and emergency procedures

Personal precautions
Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Eliminate all ignition sources if safe to do so.

Environmental precautions
Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods and material for containment and cleaning up

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

Precautions for safe 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. Use only equipment of compatible materials of construction. Keep valves and fittings free from grease and oil. Open valve slowly. Use only with equipment cleaned for oxygen service. "NO SMOKING" signs should be posted in storage and use areas. Separate flammable gas cylinders from oxygen and other oxidizers by a minimum distance of 20 ft. or by a 5 ft. high barrier with a minimum fire resistance rating of a half an hour.

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. Never attempt to lift a cylinder by its valve protection cap. 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. Use only with adequate ventilation. Use a backflow preventive device in piping. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Ensure the complete gas system has been checked for leaks before use.

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. Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

Conditions for safe storage, including any incompatibilities

Storage Conditions 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. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. 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. Stored containers should be periodically checked for general condition and leakage. Do not store near combustible materials

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

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure
limits established by the region specific regulatory bodies.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>STEL = 30000 ppm</td>
<td>TWA: 5000 ppm</td>
<td>IDLH: 40000 ppm</td>
</tr>
<tr>
<td>124-38-9</td>
<td>TWA: 5000 ppm</td>
<td></td>
<td>TWA: 5000 ppm</td>
</tr>
<tr>
<td></td>
<td>(vacated) TWA: 10000 ppm</td>
<td>TWA: 9000 mg/ m³</td>
<td>TWA: 9000 mg/ m³</td>
</tr>
<tr>
<td></td>
<td>(vacated) STEL: 30000 ppm</td>
<td>STEL: 54000 mg/ m³</td>
<td>STEL: 54000 mg/ m³</td>
</tr>
</tbody>
</table>

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

### Appropriate engineering controls

**Engineering Controls**
Ventilation systems. Use local exhaust in combination with general ventilation as necessary to keep oxygen concentrations below 23.5%. Consider installation of leak detection systems in areas of use and storage. Systems under pressure should be regularly checked for leakages.

**Individual protection measures, such as personal protective equipment**

- **Eye/face protection**
  Wear safety glasses with side shields (or goggles).

- **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**
  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.

**General Hygiene Considerations**
Handle in accordance with good industrial hygiene and safety practice.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Compressed gas</td>
</tr>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>Oxidizer</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No data available</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Molecular weight</th>
<th>Boiling point</th>
<th>Vapor Pressure</th>
<th>Vapor density (air =1)</th>
<th>Gas Density</th>
<th>Critical Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>44.01</td>
<td>-78.5 °C (Sublimes)</td>
<td>838 psig (5778 kPa) @ 21.1°C</td>
<td>1.522</td>
<td>1.839</td>
<td>31.1 °C</td>
</tr>
<tr>
<td>Oxygen</td>
<td>31.99</td>
<td>-182.9 °C</td>
<td>Above critical temperature</td>
<td>1.11</td>
<td>1.331</td>
<td>-118.6 °C</td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

Reactivity
Not reactive under normal conditions

Chemical stability
Stable under normal conditions.

Explosion data
- Sensitivity to Mechanical Impact: None.
- Sensitivity to Static Discharge: None.

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Heat, flames and sparks.

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

Hazardous Decomposition Products
None known.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

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. 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.

Skin contact
No data available.

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.

Ingestion
Not an expected route of exposure.

Information on toxicological effects

Symptoms
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%. 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.

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Irritation Not classified.
Sensitization Not classified.
Germ cell mutagenicity Not classified.
Carcinogenicity This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP.
Reproductive toxicity Not classified.
STOT - single exposure Not classified.
STOT - repeated exposure Not classified.
Chronic toxicity Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation.
Target Organ Effects Central Vascular System (CVS), Respiratory system.
Aspiration hazard Not applicable.

Numerical measures of toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
<th>Inhalation LC50 (CGA P-20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide 124-38-9</td>
<td>-</td>
<td>-</td>
<td>470,000 ppm (Rat)</td>
<td>-</td>
</tr>
</tbody>
</table>

Product Information

<table>
<thead>
<tr>
<th></th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral LD50</td>
<td>No information available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermal LD50</td>
<td>No information available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhalation LC50</td>
<td>No information available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Ecotoxicity
No known acute aquatic toxicity.

Persistence and degradability
Not applicable.

Bioaccumulation
Will not bioconcentrate.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
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

<table>
<thead>
<tr>
<th>UN/ ID no.</th>
<th>UN3156</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>Compressed gas, oxidizing, n.o.s.</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>2.2</td>
</tr>
<tr>
<td>Subsidiary class</td>
<td>5.1</td>
</tr>
<tr>
<td>Special Provisions</td>
<td>A14</td>
</tr>
<tr>
<td>Description</td>
<td>UN3156, Compressed gas, oxidizing, n.o.s.(Oxygen, Carbon Dioxide), 2.2 (5.1)</td>
</tr>
</tbody>
</table>

Emergency Response Guide Number 122
UN/ID no. | UN3156
---|---
Proper shipping name | Compressed gas, oxidizing, n.o.s.
Hazard Class | 2.2
Subsidiary class | 5.1
Description | UN3156, Compressed gas, oxidizing, n.o.s. (Oxygen, Carbon Dioxide), 2.2 (5.1)

**MEX**

UN/ID no. | UN3156
---|---
Proper shipping name | Compressed gas, oxidizing, n.o.s.
Hazard Class | 2.2
Subsidiary class | 5.1
Description | UN3156, Compressed gas, oxidizing, n.o.s. (Oxygen, Carbon Dioxide), 2.2 (5.1)

**IATA**

UN/ID no. | UN3156
---|---
Proper shipping name | Compressed gas, oxidizing, n.o.s.
Hazard Class | 2.2
Subsidiary hazard class | 5.1
ERG Code | 2X
Description | UN3156, Compressed gas, oxidizing, n.o.s. (Oxygen, Carbon Dioxide), 2.2 (5.1)

**IMDG**

UN/ID no. | UN3156
---|---
Proper shipping name | Compressed gas, oxidizing, n.o.s.
Hazard Class | 2.2
Subsidiary hazard class | 5.1
EmS-No. | F-C, S-W
Special Provisions | 274
Description | UN3156, Compressed gas, oxidizing, n.o.s. (Oxygen, Carbon Dioxide), 2.2 (5.1)

**ADR**

UN/ID no. | UN3156
---|---
Proper shipping name | Compressed gas, oxidizing, n.o.s.
Hazard Class | 2.2
Classification code | 5.1
Tunnel restriction code | (E)
Special Provisions | 274, 655
Description | UN3156, Compressed gas, oxidizing, n.o.s. (Oxygen, Carbon Dioxide), 2.2 5.1, (E)
Labels | 2.2 +5.1

**15. REGULATORY INFORMATION**

**International Inventories**

- **TSCA** | Complies
- **DSL/ NDSL** | 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 Chemical Substances/ European List of Notified Chemical Substances

**US 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

CERCLA
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.

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.

CWA (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.

US State Regulations

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

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argon 7440-37-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Helium 7440-59-7</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Nitrogen 7727-37-9</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Oxygen 7782-44-7</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

International Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Carcinogenicity</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>-</td>
<td>Mexico: TWA=5000 ppm</td>
</tr>
</tbody>
</table>

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.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES
Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user’s intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

End of Safety Data Sheet