

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Compressed gases, oxidizing, n.o.s. (oxygen, carbon dioxide, nitrogen) (MSDS No. P-6232-C) **Trade Names:** Extendapak[®] Food Gases EX 39, 40, 43, 45, 52-54, 59, 60, 64, & 69

Chemical Name: Mixtures of carbon dioxide, nitrogen, and oxygen **Synonyms:** Not applicable.

Chemical Family: Not applicable. **Product Grades:** None assigned.

Telephone: **Emergencies:** 1-800-645-4633* **Company Name:** Praxair, Inc.
CHEMTREC: 1-800-424-9300* 39 Old Ridgebury Road
Routine: 1-800-PRAXAIR Danbury, CT 06810-5113

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).*

2. Hazards Identification

EMERGENCY OVERVIEW

**WARNING! High-pressure gas mixture.
Vigorously accelerates combustion.
Can increase respiration and heart rate.
May cause nervous system damage.
May cause dizziness and drowsiness.
Self-contained breathing apparatus may be required by rescue workers.
Under ambient conditions, this is a colorless, odorless gas.**

OSHA REGULATORY STATUS: The components of this mixture are considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Mixtures containing carbon dioxide are physiologically active, affecting circulation and breathing. Breathing 80 percent or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain, and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also central nervous system (CNS) effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness, and convulsions. Breathing oxygen under pressure may prolong adaptation to darkness and reduce peripheral vision.

Skin Contact. No harm expected.

Swallowing. This product is a gas at normal temperature and pressure.

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Eye Contact. May cause a stinging sensation.

Effects of Repeated (Chronic) Overexposure. No harm expected.

Other Effects of Overexposure. Damage to retinal or ganglion cells and CNS may occur.

Medical Conditions Aggravated by Overexposure. The toxicology and the physical and chemical properties of the mixture components suggest that overexposure is unlikely to aggravate existing medical conditions.

CARCINOGENICITY: None of the components of this mixture are listed by NTP, OSHA, and IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. For further information, see section 12, Ecological Information.

3. Composition/Information on Ingredients

See section 16 for important information about mixtures.

COMPONENT	CAS NUMBER	CONCENTRATION
Carbon dioxide	124-38-9	0-76.5%
Nitrogen	7727-37-9	5-76.5%
Oxygen	7782-44-7	23.5-90%

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: No emergency care anticipated.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: Flush with water. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Get medical attention if discomfort persists.

NOTES TO PHYSICIAN: Supportive treatment should include immediate sedation, anti-convulsive therapy, if needed, and rest. See section 11, Toxicological Information.

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Oxygen-rich mixtures vigorously accelerate combustion.

SUITABLE EXTINGUISHING MEDIA: Use media appropriate for surrounding fire. Water (i.e., safety shower) is the preferred extinguishing media for clothing fires.

PRODUCTS OF COMBUSTION: Not applicable.

PROTECTION OF FIREFIGHTERS: WARNING! High-pressure gas mixture. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk. Shut off gas flow if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. Contact with flammable materials may cause fire or explosion. Heat of fire can build pressure in cylinder and cause it to rupture. No part of

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cylinder should be subjected to a temperature higher than 125°F (52°C). Cylinders containing this mixture are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.)

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

WARNING! High-pressure gas mixture.

Personal Precautions. Oxygen-rich mixtures vigorously accelerate combustion. Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if you can do so without risk. Ventilate area or move cylinder to a well-ventilated area.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: Avoid breathing gas. Keep oil, grease, and combustibles away. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open valve. If valve is hard to open, discontinue use and contact your supplier. Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. For other precautions in using Extendapak Food Gases, see section 16.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation, away from oil, grease, and other hydrocarbons. Store oxygen-rich mixtures away from oil, grease, and other flammable materials. Separate cylinders from flammables by at least 20 ft (6.1 m), or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Always secure cylinders upright to keep them from falling or being knocked over. Install cap, if provided when not in use. Screw valve protection cap firmly in place by hand. Cylinder temperature should not exceed 125°F (52°C). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

COMPONENT	OSHA PEL	ACGIH TLV-TWA (2009)
Carbon dioxide	5000 ppm	5000 ppm, 30,000 ppm (STEL)
Nitrogen	N.E.*	Simple Asphyxiant
Oxygen	N.E.*	N.E.**

*N.E.—Not Established.

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = 40,000 ppm (carbon dioxide)

ENGINEERING CONTROLS:

Local Exhaust. Use a local exhaust system, if necessary, to prevent increased oxygen concentration and to control carbon dioxide concentration in the worker’s breathing zone.

Mechanical (General). Under certain conditions, general exhaust ventilation may be acceptable to maintain a supply of air that is not too rich in oxygen and to keep carbon dioxide concentrations below the exposure limit in the worker’s breathing zone.

Special. None

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves and metatarsal shoes when handling cylinders. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Wear safety glasses when handling cylinders. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection: None required. However, air supplied respirators are required while working in oxygen deficient atmospheres such as confined spaces.

9. Physical and Chemical Properties

APPEARANCE:	Colorless gas
ODOR:	Odorless
ODOR THRESHOLD:	Not available.
PHYSICAL STATE:	Gas at normal temperature and pressure
pH:	Not applicable.
MELTING POINT at 1 atm:	Not available.
BOILING POINT at 1 atm:	Not available.
FLASH POINT (test method):	Not available.
EVAPORATION RATE (Butyl Acetate = 1):	Not available.
FLAMMABILITY:	Not applicable.
FLAMMABLE LIMITS IN AIR , % by volume:	LOWER: Not applicable. UPPER: Not applicable.
VAPOR PRESSURE at 68°F (20°C):	Not available.
VAPOR DENSITY at 70°F (21.1°C) and 1 atm:	Not available.

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SPECIFIC GRAVITY (H ₂ O = 1) at 19.4°F (-7°C):	Not available.
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	Approx. 1 to 1.38
SOLUBILITY IN WATER , % by wt:	Negligible
PARTITION COEFFICIENT: n-octanol/water:	Not available.
AUTOIGNITION TEMPERATURE:	Not available.
DECOMPOSITION TEMPERATURE:	Not available.
PERCENT VOLATILES BY VOLUME:	100
MOLECULAR WEIGHT:	Not applicable.
MOLECULAR FORMULA:	Mixtures of CO ₂ , N ₂ , & O ₂

10. Stability and Reactivity

CHEMICAL STABILITY: Unstable Stable

CONDITIONS TO AVOID: None known.

INCOMPATIBLE MATERIALS: Combustible materials; flammable materials, especially oils and greases

HAZARDOUS DECOMPOSITION PRODUCTS: None.

POSSIBILITY OF HAZARDOUS REACTIONS: May Occur Will Not Occur

11. Toxicological Information

ACUTE DOSE EFFECTS:

Oxygen Component. Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increases the susceptibility to toxicity from oxygen at high concentrations or pressures. Animal studies also indicate that vitamin E deficiency may increase susceptibility to oxygen toxicity.

Airway obstruction during high oxygen tension may cause alveolar collapse following absorption of the oxygen. Similarly, occlusion of the Eustachian tubes may cause retraction of the eardrum, and obstruction of the paranasal sinuses may produce vacuum-type headache.

Newborn premature infants exposed to high oxygen concentrations may suffer delayed retinal damage, which can progress to retinal detachment and blindness (retrolental fibroplasia). Retinal damage can also occur in adults exposed to 100% oxygen under greater than atmospheric pressure, particularly in individuals whose retinal circulation has been previously compromised.

All individuals exposed for long periods to oxygen at high pressure and all who exhibit overt oxygen toxicity should have ophthalmologic examinations.

Carbon Dioxide Component. Carbon dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

EFFECT:

Breathing rate increases slightly.

CONCENTRATION:

1%

EFFECT:	CONCENTRATION:
Breathing rate increases to 50% above normal level. Prolonged exposure can cause headache, tiredness.	2%
Breathing increases to twice normal rate and becomes labored. Weak narcotic effect. Impaired hearing, headache, increased blood pressure and pulse rate.	3%
Breathing increases to approximately four times normal rate, symptoms of intoxication become evident, and slight choking may be felt.	4 - 5%
Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment, and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.	5 - 10%
Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.	10 - 100%

STUDY RESULTS: A single study has shown an increase in heart defects in rats exposed to 6 percent carbon dioxide in air for 24 hours at different times during gestation. There is no evidence that carbon dioxide is teratogenic in humans.

12. Ecological Information

ECOTOXICITY: No known effects.

OTHER ADVERSE EFFECTS: This product does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

DOT/IMO SHIPPING NAME: Compressed gases, oxidizing, n.o.s. (oxygen, carbon dioxide, nitrogen)

HAZARD CLASS:	PACKING GROUP/Zone:	IDENTIFICATION NUMBER:	PRODUCT RQ:
2.2	NA*	UN3156	None
SHIPPING LABEL(s): NONFLAMMABLE GAS, OXIDIZER			
PLACARD (when required): NONFLAMMABLE GAS, OXIDIZER			

* Not available.

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

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MARINE POLLUTANTS: None of the components of this mixture are listed as marine pollutants by DOT.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: No

REACTIVITY: No

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

None of the components of this mixture are subject to reporting under Section 313.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

None of the components of this mixture are listed as regulated substances.

TSCA: TOXIC SUBSTANCES CONTROL ACT: The components of this mixture are listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

None of the components of this mixture are listed in Appendix A as highly hazardous chemicals.

STATE REGULATIONS:

CALIFORNIA: None of the components of this mixture are listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

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PENNSYLVANIA: None of the components of this mixture are subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *High-pressure gas mixture.* Use piping and equipment adequately designed to withstand pressures to be encountered. Use only with equipment cleaned for oxygen service and rated for cylinder pressure. Prevent reverse flow. Use a backflow prevention device in any piping. Never work on a pressurized system. If there is a leak, close the cylinder valve. Blow down the system in a safe and environmentally sound manner in compliance with all federal, state, and local laws; then repair the leak. Never place a compressed gas cylinder where it may become part of an electrical circuit.

NOTE: Before using any plastics, confirm their compatibility with the carbon dioxide component.

Mixtures. When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH = 1
FLAMMABILITY = 0
INSTABILITY = 0
SPECIAL = OX

HMIS RATINGS:

HEALTH = 1
FLAMMABILITY = 0
PHYSICAL HAZARD = 3

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-296.
PIN-INDEXED YOKE: Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION: Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 and V-7 listed below.

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Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, <http://www.cganet.com/Publication.asp>.

- AV-1 *Safe Handling and Storage of Compressed Gases*
- G-6 *Carbon Dioxide*
- P-1 *Safe Handling of Compressed Gases in Containers*
- P-9 *Inert Gases—Argon, Nitrogen, and Helium*
- P-39 *Oxygen-Rich Atmospheres*
- V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*
- V-7 *Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures*
- *Handbook of Compressed Gases, Fourth Edition*

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Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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