

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

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| Product Name: Compressed gases, n.o.s. (carbon dioxide, ethylene) (MSDS No. P-4818-F) | Trade Name: Banana Gas 32™ Gas Mixture |
| Chemical Name: Mixture of ethylene and carbon dioxide | Synonyms: Fruit-ripening gas, degreening gas |
| Formula: Mixture of C ₂ H ₄ & CO ₂ | Chemical Family: Not applicable |
| Telephone: | Company Name: Praxair, Inc. |
| Emergencies: 1-800-645-4633* | 39 Old Ridgebury Road |
| CHEMTREC: 1-800-424-9300* | Danbury, CT 06810-5113 |
| Routine: 1-800-PRAXAIR | |

* 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. Composition/Information on Ingredients

See section 16 for important information about mixtures.

| INGREDIENT | CAS NUMBER | CONCENTRATION | OSHA PEL | ACGIH TLV-TWA (2002) |
|----------------|------------|---------------|-------------------|----------------------|
| Ethylene | 74-85-1 | 6.3% | Simple asphyxiant | Simple asphyxiant |
| Carbon Dioxide | 124-38-9 | Balance | 5000 ppm | 5000 ppm |

3. Hazards Identification

EMERGENCY OVERVIEW

DANGER! High-pressure liquid and gas mixture.

Harmful if inhaled.

Can cause rapid suffocation.

May cause frostbite.

May 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.

Odor: Sweet

THRESHOLD LIMIT VALUE: TLV-TWA, 5000 ppm, carbon dioxide (ACGIH, 2002). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION—Asphyxiant. Effects are due to lack of oxygen. The carbon dioxide component is also physiologically active, affecting circulation and breathing. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation, rapid breathing, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

SKIN CONTACT—No harm expected from vapor; cold gas, or liquid or solid carbon dioxide may cause severe frostbite.

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

EYE CONTACT—Vapor may sting; cold gas, or liquid or solid carbon dioxide may cause severe frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No harm expected.

OTHER EFFECTS OF OVEREXPOSURE: May damage retinal ganglion cells and central nervous system.

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.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH

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

CARCINOGENICITY: This components of this mixture are not listed by NTP or OSHA The IARC lists ethylene as Group 3, unclassifiable as to carcinogenicity to humans.

4. First Aid Measures

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

SKIN CONTACT: Wash with plenty of soap and water. For exposure to cold vapor or solid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

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

EYE CONTACT: Immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

| | | |
|---|------------------------------|------------------------------|
| FLASH POINT (test method): | Not applicable | |
| AUTOIGNITION TEMPERATURE: | Not applicable | |
| FLAMMABLE LIMITS IN AIR , % by volume: | LOWER: Not applicable | UPPER: Not applicable |

EXTINGUISHING MEDIA: Banana Gas 32 cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: DANGER! High-pressure liquid and 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. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION 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 cylinder should be subjected to a temperature higher than 125°F (52°C). Banana Gas 32 cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.)

HAZARDOUS COMBUSTION PRODUCTS: None known.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: DANGER! High-pressure liquid and gas mixture. Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move cylinder to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing reentry.

WASTE DISPOSAL METHOD: 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 STORAGE: Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will 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.

PRECAUTIONS TO BE TAKEN IN HANDLING: 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. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions in using this mixture, see section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to section 16 for the address and phone number along with a list of other available publications.

8. Exposure Controls/Personal Protection**VENTILATION/ENGINEERING CONTROLS:**

LOCAL EXHAUST—Use a local exhaust system, if necessary, to control the concentration of carbon dioxide in the worker's breathing zone.

MECHANICAL (general)—Under certain conditions, general exhaust ventilation may be acceptable to keep carbon dioxide below the exposure limit.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: None required under normal use. If use may result in an oxygen-deficient atmosphere or may generate hazardous concentrations of gases or fumes, an air-supplied respirator must be used. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear work gloves when handling cylinders; insulated neoprene gloves when working with product.

EYE PROTECTION: Wear safety glasses when handling cylinders; add a full face shield when working with product. Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for container handling; high-top shoes are preferred. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

| | |
|---|---------------------|
| SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm: | 1.49 (calculated) |
| VAPOR PRESSURE at 68°F (20°C): | 830 psig (5723 kPa) |
| SOLUBILITY IN WATER: | Slight |
| PERCENT VOLATILES BY VOLUME: | 100 |
| APPEARANCE, ODOR, AND STATE: Colorless gas at normal temperature and pressure; sweet odor. | |

10. Stability and Reactivity

| | | |
|---|------------------------------------|--|
| STABILITY: | <input type="checkbox"/> Unstable | <input checked="" type="checkbox"/> Stable |
| INCOMPATIBILITY (materials to avoid): None known. | | |
| HAZARDOUS DECOMPOSITION PRODUCTS: None known. Thermal decomposition of ethylene may produce CO or additional CO ₂ . | | |
| HAZARDOUS POLYMERIZATION: | <input type="checkbox"/> May Occur | <input checked="" type="checkbox"/> Will Not Occur |
| CONDITIONS TO AVOID: None known. | | |

11. Toxicological Information

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: | CONCENTRATION: |
|---|-----------------------|
| Breathing rate increases slightly. | 1% |
| 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. | 50 - 100% |

12. Ecological Information

No adverse ecological effects expected. This mixture does not contain any Class I or Class II ozone-depleting chemicals. This mixture is not listed as a marine pollutant by DOT.

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, n.o.s. (carbon dioxide, ethylene) | |
| HAZARD CLASS: 2.2 | IDENTIFICATION NUMBER: UN 1956 | PRODUCT RQ: Not applicable |
| SHIPPING LABEL(s): | NONFLAMMABLE GAS | |
| PLACARD (when required): | NONFLAMMABLE GAS | |

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)].

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):

Threshold Planning Quantity (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: Yes

REACTIVITY: No

FIRE: No

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

Ethylene and mixtures containing it are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

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.

Ethylene is listed as a regulated substance in quantities of 10,000 lb (4536 kg) or greater.

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.

Neither carbon dioxide nor ethylene is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable gas on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the gas is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: Neither component of this mixture is listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: This mixture is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *High-pressure liquid and gas.* Use piping and equipment adequately designed to withstand pressures to be encountered. *Gas can cause rapid suffocation due to oxygen deficiency.* Store and use with adequate ventilation at all times. Banana Gas 32 is heavier than air. It tends to accumulate near the floor of an enclosed space, displacing air and pushing it upward. This creates an oxygen-deficient atmosphere near the floor. Ventilate space before entry. Verify sufficient oxygen concentration. Close cylinder valve after each use; keep closed even when empty. *Prevent reverse flow.* Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. *Never work on a pressurized system.* If there is a leak, close the cylinder valve. Blow the system down 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.*

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 | = 2 |
| FLAMMABILITY | = 0 |
| INSTABILITY | = 0 |
| SPECIAL | = None |

HMIS RATINGS:

| | |
|-----------------|-----|
| HEALTH | = 1 |
| FLAMMABILITY | = 0 |
| PHYSICAL HAZARD | = 0 |

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

| | | |
|---|----------------|----------------|
| THREADED: | 0-3000 psig | CGA-320 |
| PIN-INDEXED YOKE: | 0-3000 psig | 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 pamphlets V-1 and V-7 listed below.

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

| | |
|------|---|
| AV-1 | <i>Safe Handling and Storage of Compressed Gases</i> |
| P-1 | <i>Safe Handling of Compressed Gases in Containers</i> |
| V-1 | <i>Compressed Gas Cylinder Valve Inlet and Outlet Connections</i> |
| V-7 | <i>Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures</i> |
| — | <i>Handbook of Compressed Gases, Fourth Edition</i> |

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.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14151-0044).

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