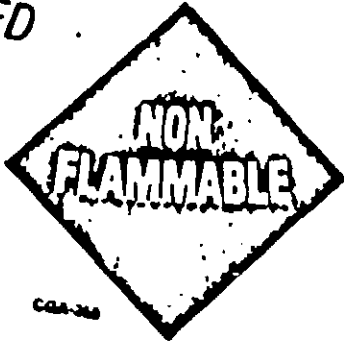


ACCEPTED
JUN 08 1983
Under the Federal Insecticide, Fungicide, and Rodenticide Act, registered under EPA Reg. No. 10330-6

COMPRESSED
GAS N.O.S.
UN1956

CARBOXIDE®
STANDARD (100%)



STERILANT - FUMIGANT GAS
ACTIVE INGREDIENT - ETHYLENE OXIDE
10% BY WEIGHT
INERT INGREDIENT - CARBON DIOXIDE
90% BY WEIGHT
NET CONTENTS - 30 LBS (13.6kg)



LINDE SPECIALTY GASES

BEFORE USING PRODUCT, READ WARNING LABEL ON SIDE OF CYLINDER

283 1646

CARBOXIDE®

STERILANT - FUMIGANT GAS

ACTIVE INGREDIENT - ETHYLENE OXIDE 10% BY WEIGHT
INERT INGREDIENT - CARBON DIOXIDE 90% BY WEIGHT

**DANGER! HIGH PRESSURE NONFLAMMABLE
LIQUID AND GAS. HARMFUL IF INHALED.
CAUSES EYE AND SKIN BURNS.
SUSPECT CANCER HAZARD.**

ODOR: ETHER-LIKE

TLV (Ethylene Oxide): 10 PPM (1982 ACGIH)

Do not breathe gas. Do not get in eyes, on skin, or clothing. Store and use with adequate ventilation. No part of the cylinder may be exposed above 125°F (52°C). Close valve when not in use and when empty. Use in accord with tag attached to valve, Linde Form L-4705 (MSDS) and safe practices booklet L-3499.

FIRST AID: IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. **IN CASE OF CONTACT**, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Discard contaminated clothing and shoes.

LEAK: Evacuate area and keep personnel upwind. Use self-contained breathing apparatus and protective clothing, and shut off leak if without risk.

FIRE: Use water spray or fog nozzle to keep cylinder cool. Move cylinder away from fire if without risk.

IN EMERGENCY: CALL CHEMTREC 800-424-9300.

FOR HOSPITAL AND INDUSTRIAL USE ONLY.

Union Carbide Corporation—Linde Division, Danbury, CT 06817

DOT Shipping Name: Compressed Gas N.O.S. UN1956

IMO Shipping Name: Ethylene Oxide and Carbon Dioxide UN1952

EPA Reg. No. 10330-6

EPA Est. No. 10330-

STB-0600 (3/83)

ACCEPTED
JUN 08 1993
Under the Federal Insecticide,
Fungicide, and Rodenticide Act,
as amended, for the pesticide
registered under
EPA Reg. No. 10330-6

LINDE SPECIALTY GASES

MADE IN USA

DO NOT REMOVE THIS LABEL

DO NOT DETACH THIS TAG

CARBOXIDE®
STERILANT-FUMIGANT GAS

ACTIVE INGREDIENT-ETHYLENE OXIDE 10% BY WEIGHT
INERT INGREDIENT-CARBON DIOXIDE 90% BY WEIGHT

DIRECTIONS FOR USE

To be used only by persons experienced in Carboxide® gas sterilization and fumigation, or by persons under direct supervision of persons who are experienced in Carboxide® gas sterilization or fumigation. Use only in accordance with directions given on this tag and the safety precautions listed on the body label. See current Union Carbide Corporation, Linde Division, Material Safety Data Sheet, Form L-4705 and safe practices booklet L-3499 for additional safety information.

This mixture is NONFLAMMABLE, but if Item 8 of "General Information" below is not followed, a flammable mixture could result.

GENERAL INFORMATION

1. This cylinder is equipped with an eductor tube and is designed to discharge liquid.
2. The approximate vapor pressure exerted by this gas mixture will be 750 psig (5170 kPa) at 70°F (21.1°C) while liquid is present. Vapor pressure will be lower if temperature is below 70°F (21.1°C), higher if temperature is above 70°F (21.1°C).
3. Cylinder must be in an upright position when discharging. Cylinder must be secured to prevent falling over.
4. Discharge valve outlet is provided with a CGA 350 connection which has left-hand threads. Make sure valve threads are undamaged. Do not attach ordinary pipe fittings to this valve.
5. Use metal (except aluminum) fittings and piping or Teflon lined tubing capable of withstanding the pressures to be encountered. Install pressure relief device where liquid can be trapped between valves. Ethylene-propylene rubber and Teflon are suitable materials for gaskets.
6. Install check valves in the discharge line from this cylinder to processing equipment to prevent backflow into cylinder.
7. Open cylinder valve by turning handwheel counterclockwise. Never use a wrench or other leverage device to open or close cylinder valve.
8. ALWAYS OPEN THE CYLINDER VALVE WIDE OPEN WHEN DISCHARGING CONTENTS. Do not retard flow of gas from cylinder by throttling cylinder valve or by using pressure regulators because the ratio of Carbon Dioxide to Ethylene Oxide in the gas mixture will be changed.

STERILIZATION

1. Use Carboxide® only in sterilizers designed for use with 10% by weight Ethylene Oxide and 90% by weight Carbon Dioxide.
2. Use Carboxide® in accordance with directions supplied by the sterilizer manufacturer.
3. Sterilizer temperature and pressure influence both exposure time and Ethylene Oxide concentration. The variation of type and quantity of material to be sterilized, how packed, size of sterilizer, types of bacteria to be killed, and chamber relative humidity also affect exposure time required for sterilization. Gas sterilizer cycle parameters should be those prescribed by the sterilizer manufacturer.

If applicable, if other cycle parameters are used the efficacy of the alternate cycle must be validated and is the responsibility of the user.

4. Aerate sterilized materials before use.

FUMIGATION

1. Fumigation with Carboxide® should be performed in vacuum or gastight chambers designed for use with 10% by weight Ethylene Oxide and 90% by weight Carbon Dioxide. If vacuum or gastight chambers are not used, precautions must be taken to ensure the safety of all potentially exposed personnel.
2. If Carboxide® is not used in fumigation chamber, provisions must be made to assure complete vaporization of the liquefied compressed gas by using an appropriately designed heat exchanger or a vaporizing nozzle (Linde P/N 201-4080).
3. Place warning signs around areas where material is being fumigated. Ventilate adjacent areas.
4. Use self-contained breathing apparatus and protective clothing if personnel are required in an enclosed area during the initial gassing of that area.
5. Ventilate fumigated area before entering. Aerate fumigated materials before use.
6. Do not allow liquid to strike any object within 5 feet (1.5m) of the cylinder valve or other outlet. Discharge of liquid onto objects closer than 5 feet (1.5m) may cause solvent damage or a release of a high proportion of Ethylene Oxide. This distance may be reduced to 24 inches (61 cm) if an appropriate vaporizing nozzle is used (Linde P/N 201-4080).
7. When performing space fumigation, ensure that the gas is distributed evenly throughout the area being treated.
8. If dosage required is less than the entire contents of this cylinder, determine the quantity withdrawn by using an appropriate scale. THE PROPER GAS MIXTURE CAN ONLY BE MAINTAINED BY DISCHARGING A MINIMUM OF 12 POUNDS (5.4 Kg) FROM EACH CYLINDER.

Dosage

- A. For chamber fumigation at 70°F (21.1°C) or higher, materials such as furs, clothing, furniture, spices, and natural seasonings are typically treated with 15 pounds (6.8 Kg) by weight of Carboxide® per 1000 cubic feet (28.3 m³) of chamber space for 18 hours. Treatment may not be effective if material is densely packed.
- B. For transportation equipment such as planes, trailers, passenger cars, and buses at 70°F (21.1°C) or higher, 10 pounds (4.5 Kg) by weight of Carboxide® is typically used for every 1000 cubic feet (28.3 m³) of vehicle space for 5 to 6 hours.

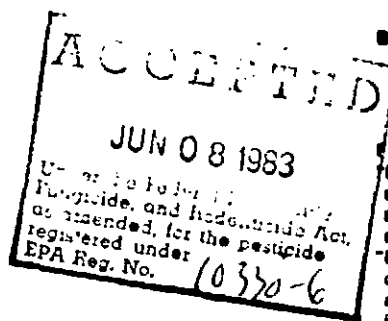
FOOD TREATMENT 21 CFR 183.200

Ethylene oxide may be safely used as a fumigant for the control of microorganisms and insect infestation in ground spices and other processed natural seasoning materials except mixtures to which salt has been added. Ethylene oxide, either alone or combined with carbon dioxide or dichlorodifluoromethane, shall be used in amounts not to exceed that required to accomplish the intended technical effects.

Union Carbide Corporation - Linde Division, Danbury, CT 06817

LINDE SPECIALTY GASES

STT-0600 (3-83)



MATERIAL SAFETY DATA SHEET

L-4705-A

(Essentially similar to U.S. Department of Labor Form OSHA-201)
 An explanation of the terms used herein may be found in OSHA
 publication 2265, available from OSHA regional or area offices.
 Do Not Duplicate This Form. Request an Original.

I. PRODUCT IDENTIFICATION

| | |
|---|--|
| PRODUCT CARBOXIDE [®] (Liquefied Gas Mixture Under Pressure) | |
| CHEMICAL NAME | SYNONYMS Fumigant Sterilant Mixture, 10 90 |
| FORMULA | CHEMICAL FAMILY |
| Mixture of ethylene oxide and carbon dioxide | MOLECULAR WEIGHT |
| TRADE NAME CARBOXIDE [®] | |

II. HAZARDOUS INGREDIENTS

For mixtures of this product request the respective component Material Safety Data Sheets
 See Section IX

| MATERIAL | Wt (%) | 1982 ACGIH TLV-TWA (Units) |
|----------------|--------|---|
| Ethylene Oxide | 10 | 10 ppm (20 mg/m ³) 1 ppm, A2 (1982 - Notice of intended changes) |
| Carbon Dioxide | 90 | 5,000 ppm (9,000 mg/m ³) |

ACCEPTED

JUN 08 1983

Under the Federal Insecticide, Fungicide and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 16236-6

NOTE: Currently Union Carbide Corp. has established for its own use a TLV-TWA of 5 ppm.

III. PHYSICAL DATA

| | |
|---|---|
| BOILING POINT, 760 mm. Hg | FREEZING POINT |
| SPECIFIC GRAVITY (H ₂ O = 1) | VAPOR PRESSURE AT 20 C. 750 psig |
| VAPOR DENSITY (air = 1) 1.53 | SOLUBILITY IN WATER, % by wt. Appreciable. See Section IX |
| PERCENT VOLATILES BY VOLUME 100 | EVAPORATION RATE (Butyl Acetate = 1) High |

APPEARANCE AND ODOR Colorless liquid, colorless gas, nonresidual ether like odor in high concentration.

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times at 204 744 3487
 For routine information contact your local supplier.

Union Carbide Corporation requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

UNION CARBIDE CORPORATION LINDE DIVISION
 Old Ridgebury Road, Danbury, CT 06817

L-4705-A

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE AND EMERGENCY AND FIRST AID PROCEDURES

Due to the presence of Ethylene Oxide (EO) in this mixture the full text of the Health Hazards section of the EO Material Safety Data Sheet is repeated below:

ACUTE EFFECTS OF OVEREXPOSURE

SWALLOWING: A very unlikely route of exposure. Severe irritation and ulceration of the mouth and throat, abdominal pain, nausea, vomiting, collapse, and coma.

INHALATION: Irritation of the eye, nose, and throat. Headache, nausea, vomiting, diarrhea, coughing, chest tightness, cyanosis, weakness, drowsiness, loss of coordination, convulsions, and coma. Delayed onset pulmonary edema may occur.

SKIN: Absorption by sustained contact with the skin is unlikely, but could lead to headache, dizziness, nausea, and vomiting. Contact with liquid can lead to delayed onset of erythema, edema, vesiculation, and blister formation. Usually several hours to onset.

EYES: Burns from liquid, moderate eye irritation from vapor.

CHRONIC EFFECTS OF OVEREXPOSURE

Ethylene Oxide is mutagenic. Animals exposed to Ethylene Oxide vapor for up to 2 years have shown an increase in the incidence of malignant tumors compared with controls. Ethylene Oxide should be regarded as a suspect cancer agent.

OTHER HEALTH HAZARDS

Allergic contact dermatitis may occur. A few cases of neuropathy (mainly peripheral) have been described from recurrent exposure to high vapor concentrations.

EMERGENCY AND FIRST AID PROCEDURES

SWALLOWING: Drink a glass of water and induce vomiting. Call a physician.

INHALATION: Remove to fresh air, and administer oxygen if breathing is difficult. Observe for vomiting. If breathing stops, start artificial respiration, preferably with the simultaneous administration of oxygen. Call a physician.

SKIN: Immediately remove contaminated clothing and wash skin copiously with soap and water. Contact a physician if irritation persists or blisters form.

EYES: Flush immediately with water and continue for at least 15 minutes. Contact an ophthalmologist immediately.

NOTE: Aerate contaminated clothing, then wash clothing before re-use. Destroy contaminated leather articles such as shoes and gloves.

NOTES TO PHYSICIAN

1. Persons exposed to Ethylene Oxide may develop severe and intractable vomiting, requiring the use of antiemetics given intravenously.
2. Prolonged or high vapor concentration exposure may result in the development of pulmonary edema after a latent phase of several hours. Also, respiratory tract injury caused by Ethylene Oxide may predispose to the development of a secondary respiratory infection. Individuals exposed to moderately high vapor concentrations of Ethylene Oxide should be retained for observation.
3. Following skin contamination, primary irritation and blister formation may be delayed in onset.

Due to the high percentage of Carbon Dioxide in this mixture, the full text of the Health Hazards Section of the CO₂ Material Safety Data Sheet is repeated below:

EFFECTS OF OVEREXPOSURE AND EMERGENCY AND FIRST AID PROCEDURES

Carbon Dioxide acts as an asphyxiant by displacing oxygen, and also causes toxic symptoms when present in sufficient amounts.

SYMPTOMS: Headache, increased breathing rate, difficult breathing, perspiration, dizziness, ringing in ear, lips blue, tremors and weakness, visual disturbance, drowsiness, unconsciousness.

TREATMENT FOR ASPHYXIA: Remove from oxygen deficient atmosphere, clear airway, if breathing difficult, administer oxygen if not breathing, give artificial respiration - preferably mouth to mouth. Call a physician.

PRODUCT: CARBOXIDE *

L-4705-A

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)

Self-contained breathing apparatus where needed

| | |
|-------------|------------------------------------|
| VENTILATION | LOCAL EXHAUST Preferred |
| | MECHANICAL (general) Acceptable |
| | SPECIAL |
| | OTHER |

PROTECTIVE GLOVES Neoprene

EYE PROTECTION Full face shield and safety glasses or coverall goggles.

OTHER PROTECTIVE EQUIPMENT

Metatarsal shoes for cylinder handling, safety shower, eyewash fountain. Rubber shoes and apron when risk of liquid spill exists.

SPECIAL PRECAUTIONS

Liquefied gas mixture under pressure. Under certain conditions may form explosive mixtures with air. (See Section V). Can cause rapid suffocation due to oxygen deficiency. Avoid contact with eyes, skin or clothing. Safety showers and eyewash fountains should be immediately available. Use piping and equipment adequately designed to withstand pressures to be encountered. Keep away from heat, sparks and open flame. Store and use with adequate ventilation at all times. Use only in a closed system. Close valve when not in use and when empty.

It may be feasible to convert aqueous solutions of ethylene oxide to ethylene glycol (under the correct conditions of pH, temperature and pressure) and dispose of glycol solution. Under certain conditions EO will evolve from water solutions. See Section VIII, Ventilation.

BIOLOGICAL TREATMENT: Ethylene Oxide is amenable to disposal in standard bacteriological waste treatment facilities under controlled conditions after proper acclimation of system.

Contaminated rubber gloves and rubber clothing should be allowed to air out for several days before cleaning and re-use.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to 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 make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

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

OTHER HANDLING AND STORAGE CONDITIONS Never work on a pressurized system. If there is a leak, close the cylinder valve, blow down the system by venting to a safe place, then repair the leak.

The opinions expressed herein are those of qualified experts within Union Carbide Corporation. 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 opinions and the conditions of use of the product are not within the control of Union Carbide Corporation, it is user's obligation to determine the conditions of safe use of the product.



UNION CARBIDE CORPORATION
LINDE DIVISION

GENERAL OFFICES DANBURY, CT
OFFICES IN PRINCIPAL CITIES