



SDS: 0011037
Date Prepared: 27-Oct-2016

SAFETY DATA SHEET

1. IDENTIFICATION

Product Identifier: ECO2FUME® Fumigant Gas
Synonyms: None
Product Description: Physical mixture of phosphine and carbon dioxide

RELEVANT IDENTIFIED USES OF THE SUBSTANCE OR MIXTURE AND USES ADVISED AGAINST

Intended/Recommended Use: Fumigant .

DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

CYTEC AUSTRALIA HOLDINGS PTY LIMITED

ABN : 45 081 148 629

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EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:

Asia Pacific:

Australia - +61-3-9663-2130 or 1800-033-111 (IXOM)

China (PRC) - +86 0532 83889090 (NRCC)

New Guinea - +61-3-9663-2130 or 1800-033-111

New Zealand - +61-3-9663-2130 or 0800-734-607 (IXOM)

India, Japan, Korea, Malaysia, Thailand - +65 3158 1074 (Carechem24 Singapore)

India (Hindi Speaking Only) - +65 3158 1198 or 000800 100 7479 (Carechem24 Singapore)

Canada: +1-905-356-8310 (Cytec Welland, Canada plant)

Europe/Africa/Middle East (Carechem24 UK):

Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670

(Arabic speaking countries) - +44 (0) 1235 239 671

Latin America:

Brazil - 0800 7077 022 (SUATRANS)

Chile - +56-2-2-247-3600 (CITUC QUIMICO)

All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)

USA: +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

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2. HAZARDS IDENTIFICATION

Classified according to the Australian Approved Criteria for Classifying Hazardous Substances and the ADG Code

Hazard Classification: HAZARDOUS SUBSTANCE. DANGEROUS GOODS.

CLASSIFICATION OF THE SUBSTANCE OR MIXTURE

Classification according to the Australian Work Health and Safety (WHS) Act and Regulations

Gases Under Pressure - Liquefied Gas
 Acute Toxicity (Inhalation) Hazard Category 3
 Skin Corrosion / Irritation Hazard Category 2
 Serious Eye Damage / Eye Irritation Hazard Category 2A

LABEL ELEMENTS



Signal Word

DANGER

Hazard Statements

Contains gas under pressure; may explode if heated
 Toxic if inhaled
 Causes skin irritation
 Causes serious eye irritation

Precautionary Statements

Avoid breathing dust/fume/gas/mist/vapours/spray.
 Use only outdoors or in a well-ventilated area.
 Wash face, hands and any exposed skin thoroughly after handling.
 Wear protective gloves/protective clothing/eye protection/face protection.
 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 Call a POISON CENTER or doctor/physician.
 Specific treatment (see supplemental first aid instructions on this label).
 IF ON SKIN: Wash with plenty of soap and water.
 Take off all contaminated clothing and wash it before reuse.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
 Continue rinsing.
 Protect from sunlight. Store in a well-ventilated place.
 Store in a well-ventilated place. Keep container tightly closed.
 Store locked up.
 Dispose of contents/container in accordance with local and national regulations.

OTHER HAZARDS

Contact with liquified gas may cause frostbite
 Asphyxiant gas - depletes available oxygen in breathing air
 Phosphine gas may react with certain metals and cause corrosion, especially at higher temperatures and relative humidity.

3. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS

Component / CAS No.	%	Classification
Carbon dioxide 124-38-9	97.8 - 98.2	Acute Tox. 4 (H332)

Component / CAS No.	%	Classification
Phosphine 7803-51-2	1.8 - 2.2	Flam. Gas 1 (H220) Press. Gas Acute Tox. 1 (H330) Skin Corr. 1B (H314) Eye Dam. 1 (H318) Aquatic Acute 1 (H400)

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye Contact:

Never put oil or ointment into eyes without medical advice. In case of freezing or cryogenic burns by rapidly evaporating liquid, rinse eyes with cool water. Do not rinse eyes with hot or even warm water. Remove victim from source of contamination. Open eyelids wide to allow liquid to evaporate. In case of contact with gas, hold eyelids open and immediately wash continuously with cool water for at least 15 minutes. Obtain medical attention immediately.

Skin Contact:

Liquefied gas may cause frostbite if contact is made with skin. Treat as thermal burn. Remove contaminated clothing and shoes without delay. Get medical attention immediately. When vaporized, gas is not known to be absorbed through skin and skin contact is not an expected route of exposure.

Ingestion:

Not an expected route of exposure.

Inhalation:

Move person to fresh air. If person is not breathing, immediately call for emergency medical support then, begin cardiopulmonary resuscitation including artificial respiration, preferably with a bag-valve-mask device if possible. Rescuers within the areas of potentially unsafe levels of this product (the "HOT ZONE") should employ appropriate personal protective equipment such as SCBA during the rescue of the victim. Call a poison control center or doctor for further treatment advice.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

None known

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS

Notes To Physician:

This product is a gaseous mixture of phosphine (not phosgene) and carbon dioxide. Mild exposure by inhalation causes malaise, ringing of ears, fatigue, nausea and pressure in chest, which are relieved by removal to fresh air. Moderate poisoning causes weakness, vomiting, pain just above stomach, chest pain, diarrhea and difficulty breathing. Symptoms of severe poisoning may occur within a few hours or up to several days, resulting in pulmonary edema and may lead to dizziness, cyanosis, unconsciousness and death.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Suitable Extinguishing Media:

Move containers from fire area if it can be done without risk. For small fires, use carbon dioxide or dry chemical to extinguish fires. For large fires, use water spray, fog or alcohol foam to extinguish fires.

SPECIFIC HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

In case of fire, stop flow of gas if possible. Keep cylinders cool by spraying with water if exposed to fire. Cylinders are not fitted with pressure relief devices and may explode if over-heated. Move cylinders from fire area if you can do it without risk. Withdraw immediately if cylinders can not be kept cool. Damaged cylinders should be handled only by a specialist.

ADVICE FOR FIREFIGHTERS

Protective Equipment:

Wear self-contained, positive pressure breathing apparatus and full firefighting protective clothing for fire situations only. See MSDS Section 8 (Exposure Controls/Personal Protection).

HAZCHEM Code: 2XE

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:

Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure.

Environmental Precautions:

None known

Methods and material for containment and cleaning up:

All releases can produce high levels of gas. Evacuate area. Stop leak if possible if it can be done without risk. Isolate area until gas has dispersed.

References to other sections:

See Sections 8 and 13 for additional information.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

Precautionary Measures: Do not breathe gas. Do not get in eyes, on skin or on clothing. Keep container tightly closed. Use with adequate ventilation. Keep cylinder out of sun and away from heat. Keep cylinder in an upright position and protect from falling. This gas deadens the sense of smell. Do not depend on odor to detect presence of gas. Read and follow Application Manual before using this product.

X POISON X

Special Handling Statements: Cylinders must be handled in accordance with industry standards for compressed gases. Refer to the Compressed Gas Association (CGA) Pamphlet P-1 "Safe Handling of Compressed Gases In Containers". Phosphine gas may react with certain metals and cause corrosion, especially at higher temperatures and relative humidity. Metals such as brass, copper and other copper alloys and precious metals are susceptible to corrosion. Small electric motors, smoke detectors, brass sprinkler heads, batteries, chargers, forklifts, sensors, communication devices, computers and other electronic or electrical equipment should be protected or removed before fumigation.

Conditions for safe storage, including any incompatibilities:

Cylinders should be stored in an assigned area which should be cool, dry, well ventilated and fire resistant. It is recommended that both full and used cylinders be stored outdoors in a dedicated and properly designed and labeled storage area, away from other building ventilation intakes. This area should be secured, locked and have a well-drained, firm and level surface, preferably reinforced concrete. Cylinders must be stored in an upright position and secured or protected from falling. It is preferred to store cylinders at less than 52C (125 F), however it is safe to store cylinders at temperatures up to 60 C (140F). The indoor storage of toxic gases is prohibited in some jurisdictions. The storage of these gases in occupied spaces is not recommended. Indoor storage in a separate building with no other occupancy is suitable. The building should be adequately ventilated and equipped with a continuous monitoring and alarm system.

Storage Temperature: Store at <60 °C

Reason: Safety.

Australian AS 1940 Storage Classification: Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CONTROL PARAMETERS - Limits

Carbon dioxide 124-38-9

Australia:	5000 ppm (TWA) 9000 mg/m ³ (TWA) 12500 ppm in coal mines (TWA) 22500 mg/m ³ in coal mines (TWA) 30000 ppm (STEL) 54000 mg/m ³ (STEL)
New Zealand:	5000 ppm (TWA) 9000 mg/m ³ (TWA) 30000 ppm (STEL) 54000 mg/m ³ (STEL)
ACGIH (TLV):	30000 ppm (STEL) 5000 ppm (TWA)

Phosphine 7803-51-2

Australia:	0.3 ppm (TWA) 0.42 mg/m ³ (TWA) 1 ppm (STEL) 1.4 mg/m ³ (STEL)
New Zealand:	0.3 ppm (TWA) 0.42 mg/m ³ (TWA) 1 ppm (STEL) 1.4 mg/m ³ (STEL)
ACGIH (TLV):	1 ppm (STEL) 0.3 ppm (TWA)

Engineering Measures:

All direct exposure to this material must be prevented.

Respiratory Protection:

Where exposures are unknown or exceed the established exposure standard, use recommended respirator or full protective suit with air supply appropriate for the material and level of exposure. Where exposures are below the PEL, no respiratory protection is required. See governmental recommendations on respiratory protection such as US NIOSH `GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION`.

Recommended:

Respiratory protection should be available at the site when applying ECO2FUME. An approved, full-face gas mask phosphine cartridge or canister combination may be used at levels of 0.3 ppm up to 15 ppm or as per pesticide-specific directions from the respirator manufacturer regarding use conditions, maximum phosphine concentration protection levels and instructions for escape. The filter or canister must be approved for phosphine and suitable for short-term exposure only (type B for inorganic gases, codes ABE1 or ABE2 as used by filter manufacturers). A suggested life of one hour for filters/canisters, at usual exposure levels of operators in routine testing procedures, is a recommended safeguard. In situations where the concentration of phosphine is unknown or above 15 ppm (or the manufacturer specific maximum phosphine concentration protection level for cartridge or canister respirators) an approved, SCBA must be worn. An adequate number of approved self-contained breathing apparatus (SCBA) with full face piece and operated in pressure-demand mode should be available. Respiratory protection (SCBA) must be worn during trouble shooting for leaks if the concentration of phosphine is unknown or known to exceed the STELs for phosphine and/or carbon dioxide. Respiratory protection must be used according to local regulations, including regular training of workers in the proper use of respiratory protection equipment, medical clearance for respirator use, fit testing, inspection, maintenance, cleaning and storage of respiratory protection equipment. Facial hair should be shaved as it will prevent an adequate seal of the mask against the skin.

Eye protection:

Provide eye wash fountain and safety shower in close proximity to points of potential exposure. Prevent eye and skin contact. Safety glasses should be worn when working with pressurized equipment.

Skin Protection:

Wear leather work gloves or leather faced cotton gloves when connecting or disconnecting cylinders from dispensing equipment. Steel toed safety shoes are recommended for anyone handling compressed gas cylinders.

Hand protection:

Wear impermeable gloves.

Additional Advice:

Food, beverages, and tobacco products should not be carried or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Hand trucks are the recommended means of moving individual ECO2FUME cylinders about the fumigation site to avoid manual handling injury. The hand truck should be designed specifically for compressed gas cylinders and equipped with a suitable chain or strap to ensure the cylinder remains in place. Cylinder lifter/trolley is also recommended for moving and lifting cylinders into elevated heights. Never move an ECO2FUME cylinder without valve cap and cylinder cap in place.

9. PHYSICAL AND CHEMICAL PROPERTIES

INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Colour:	colourless
Odor:	garlic
Odor Threshold:	See Section 8 for exposure limits.
pH:	Not applicable
Melting Point:	sublimes
Boiling Point:	sublimes
Flash point:	Non Flammable
Evaporation Rate:	Not applicable
Flammability (solid, gas):	Not available
Flammable Limits (% By Vol):	Non-flammable mixture
Vapor Pressure:	47266 mm Hg @ 25 °C
Vapour density:	1.53 @ 25 °C
Specific Gravity/Density:	Not applicable
Solubility In Water:	slight

Partition coefficient (n-octanol/water):	Not applicable
Autoignition (Self) Temperature:	Not applicable
Decomposition Temperature:	Not available
Viscosity (Kinematic):	Not available
Viscosity (Dynamic):	Not available

OTHER INFORMATION

Fat Solubility (Solvent-Oil):	Not available
Percent Volatile (% by wt.):	100
Solids Content:	Not available
Saturation In Air (% By Vol.):	Not applicable
Acid Number (mg KOH/g):	Not available
Hydroxyl Value (mg KOH/g):	Not available
Volatile Organic Content (1999/13/EC):	Not applicable
Dissociation Constant:	Not available
Explosion Properties:	Not available
Oxidizing Properties:	Not available
Granulometry (Particle Size):	Not available

DUST HAZARD INFORMATION

Particle Size (microns):	Not applicable
Kst (bar-m/sec):	Not applicable
Maximum Explosion Pressure (Pmax):	Not applicable
Dust Class:	Not applicable
Minimum Ignition Energy (MIE) (mJ):	Not applicable
Minimum Ignition Temperature (MIT) (°C):	Not applicable
Minimum Explosive Concentration (MEC) (g/m³):	Not applicable
Limiting Oxygen Concentration (LOC) (%):	Not applicable

10. STABILITY AND REACTIVITY

Reactivity:	No information available
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CHEMICAL STABILITY

Stability:	Stable
Conditions To Avoid:	None known

POSSIBILITY OF HAZARDOUS REACTIONS

Polymerization:	Will not occur
Conditions To Avoid:	None known

Incompatible materials:	Copper, brass and other copper alloys, precious metals.
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Hazardous Decomposition Products:	oxides of phosphorus oxides of carbon
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11. TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Likely Routes of Exposure: Skin, Eyes, Respiratory System.

Acute toxicity - oral: Not classified - Based on available data and/or professional judgment, the classification criteria are not met.

Acute toxicity - dermal: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Acute toxicity - inhalation: Toxic if inhaled.

Skin corrosion / irritation: Causes skin irritation.

Serious eye damage / eye irritation: Causes serious eye irritation.

Respiratory sensitization: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Skin sensitization: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Carcinogenicity: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Germ cell mutagenicity: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Reproductive toxicity: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Specific target organ toxicity (STOT) - single exposure: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Specific target organ toxicity (STOT) - repeated exposure: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

Aspiration hazard: Not Classified - Based on available data and/or professional judgment, the classification criteria are not met.

PRODUCT TOXICITY INFORMATION

ACUTE TOXICITY DATA

oral (gavage)	rat	Acute LD50	Not an expected route of exposure
dermal	rabbit	Acute LD50	Not an expected route of exposure
inhalation	rat	Acute LC50 1 hr	4027 ppm (Gases)

LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	dermal	May cause frostbite
Acute Irritation	eye	May cause frostbite

ALLERGIC SENSITIZATION

Sensitization	dermal	No data
Sensitization	inhalation	No data

GENOTOXICITY

Assays for Gene Mutations

Ames Salmonella Assay No data

OTHER INFORMATION

Contact with liquified gas may cause frostbite
Asphyxiant gas - depletes available oxygen in breathing air

HAZARDOUS INGREDIENT TOXICITY DATA

Carbon dioxide, in a liquefied or solid state, can cause frostbite and freeze burns with contact. Carbon dioxide gas is an asphyxiant which depletes the amount of available oxygen in breathing air. Overexposure to carbon dioxide at low levels can cause headache, nausea, weakness, confusion, and labored breathing. Overexposure to higher concentrations can cause excitation, euphoria, dizziness, drowsiness, loss of consciousness, coma, and death. The 4-hour inhalation LC50 (rat) value is estimated to be >5,000 ppm.

Phosphine has a 4-hour inhalation LC50 (rat) value of 57 ppm (0.079 mg/L). Inhalation overexposure is characterized by severe pulmonary irritation, dyspnea, dizziness, lethargy, and stupor. Human evidence indicates that pulmonary irritation and pulmonary edema are the main toxic effects of phosphine inhalation. Phosphine has also been shown to cause central nervous system depression and gastrointestinal irritation, as well as, renal and hepatic toxicity. Acute inhalation overexposure to high concentrations of phosphine can be fatal. This material is pyrophoric and therefore, contact with skin or eyes may produce thermal burns. In an in vivo cytogenetic study, rats exposed to phosphine via inhalation at concentrations of 0, 6.2 and 19 ppm were examined for chromosomal aberrations in whole blood lymphocytes and bone marrow cells. A significant increase in cells with chromosomal aberrations were seen in male rats exposed to 19 ppm phosphine. No increase in cells with chromosomal aberrations were observed in the bone marrow of female rats, nor in the whole blood lymphocytes of male or female rats.

12. ECOLOGICAL INFORMATION

TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS

This material is not classified as dangerous for the environment.

Environmental exposure from substances of this preparation are limited due to the physical form of the product.

RESULTS OF PBT AND vPvB ASSESSMENT

Not determined

HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Carbon dioxide 124-38-9	Not available	Not available	Not available
Phosphine 7803-51-2	Not available	Not available	Not available

13. DISPOSAL CONSIDERATIONS

The Company encourages the recycle, recovery and reuse of materials, where permitted. If disposal is necessary, The Company recommends that organic materials, especially when classified as hazardous waste, be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

Australia (ADG)

Dangerous Goods? X

Proper Shipping Name:	Liquefied gas, toxic, n.o.s.
Hazard Class:	2.3
UN Number:	UN3162
Transport Label Required:	Toxic Gas
Technical Name (N.O.S.):	Contains phosphine
HAZCHEM Code:	2XE

IMO

Dangerous Goods? X

Proper Shipping Name:	Liquefied gas, toxic, n.o.s.
Hazard Class:	2.3
UN Number:	UN3162
Transport Label Required:	Toxic Gas
Technical Name (N.O.S.):	Contains phosphine

ICAO / IATA

Dangerous Goods? Forbidden

15. REGULATORY INFORMATION

SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS

Agricultural and Veterinary Chemicals Regulations: Not applicable

Work Health and Safety Regulations: Not applicable

National Pollutant Inventory: Not applicable

High Volume Industrial Chemical List: Applicable
Carbon dioxide (124-38-9)

Poison Schedule No.: 7

Inventory Information

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on AICS. Not to be available except to authorized or licensed persons. APVMA Approval: File Number 50177.

European Economic Area (including EU): When purchased from a Cytec legal entity based in the EU, this product is compliant with the registration of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, pre-registered and/or registered.

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

Fire: 0 - Materials that will not burn.

Instability: 1 - Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures.

Reasons for Issue: New Format

Classification methods include one or more of the following: use of specific product data, read-across data, modeling, professional judgment or a component based evaluation.

Date Prepared: 27-Oct-2016

Date of last significant revision: 27-Oct-2016

Component Hazard Phrases

Carbon dioxide

H332 - Harmful if inhaled.

Phosphine

H220 - Extremely flammable gas.

H314 - Causes severe skin burns and eye damage.

H330 - Fatal if inhaled.

H400 - Very toxic to aquatic life.

Prepared By: Legal & Compliance Services; E-mail: custinfo@cytec.com
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