



SDS: 0010913
Date Prepared: 02/05/2017

SAFETY DATA SHEET

1. IDENTIFICATION

Product Name: VAPORPH3OS® Phosphine Fumigant
Product Description: Phosphine gas
Synonyms: Phosphine, Hydrogen Phosphide
Chemical Family: Phosphine
Molecular Formula: PH₃
Molecular Weight: 34
Intended/Recommended Use: Fumigant

CYTEC INDUSTRIES INC., 504 CARNEGIE CENTER, PRINCETON, NEW JERSEY 08540, USA

For Product and all Non-Emergency Information call 1-800/652-6013. Outside the USA and Canada call 1-973/357-3193.

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

Asia Pacific:

Australia - +61 2 8014 4558 (Carechem24)
China (PRC) - +86 0532 83889090 (NRCC) +86 512 8090 3042 (Carechem24)
New Guinea - +61 2 8014 4558 (Carechem24)
New Zealand - +64 9 929 1483 (Carechem24)
India, Japan, Korea, Malaysia, Thailand - +65 3158 1074 (Carechem24 Singapore)
India (Hindi Speaking Only) - +65 3158 1198 or 000800 100 7479 (Carechem24 Singapore)

Canada: 800 424 9300 (Within US, Canada) +1 (703) 527-3887 (International) (CHEMTREC)

Europe/Africa/Middle East (Carechem24 UK):

Europe, Middle East, Africa, Israel - +44 1235 239 670
(Arabic speaking countries) - +44 1235 239 671

Latin America:

Brazil - +55 11 3197 5891 (Carechem24)
Chile - +56 2 2582 9336 (Carechem24)
All Others - +44 1235 239 670 (Carechem24 UK)

USA: 800 424 9300 (Within US, Canada) +1 (703) 527-3887 (International) (CHEMTREC)

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2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Gas Hazard Category 1
Gases Under Pressure - Compressed Gas
Acute Toxicity (Inhalation) Hazard Category 1
Skin Corrosion / Irritation Hazard Category 1B
Serious Eye Damage / Eye Irritation Hazard Category 1
Aquatic Environment Acute Hazard Category 1

LABEL ELEMENTS

**Signal Word**

Danger

Hazard Statements

Extremely flammable gas

Contains gas under pressure; may explode if heated

Fatal if inhaled

Causes severe skin burns and eye damage

Very toxic to aquatic life

Precautionary Statements

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Do not breathe dust/fume/gas/mist/vapours/spray.

Use only outdoors or in a well-ventilated area.

Wear respiratory protection.

Wash face, hands and any exposed skin thoroughly after handling.

Wear protective gloves/protective clothing/eye protection/face protection.

Avoid release to the environment.

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Eliminate all ignition sources if safe to do so.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment (see supplemental first aid instructions on this label).

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

Wash contaminated clothing before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Collect spillage.

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.

Hazards Not Otherwise Classified (HNOC), Other Hazards

Phosphine gas may react with certain metals and cause corrosion, especially at higher temperatures and relative humidity.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance, Mixture or Article? Substance

HAZARDOUS INGREDIENTS

Component / CAS No.	%	GHS Classification	Carcinogen
Phosphine 7803-51-2	97 - 99	Flam. Gas 1 (H220) Press. Gas Acute Tox. 1 (H330) Skin Corr. 1B (H314) Eye Dam. 1 (H318) Aquatic Acute 1 (H400)	IARC 2A(as Non-arsenical insecticides)

Component / CAS No.	%	GHS Classification	Carcinogen
Hydrogen 1333-74-0	0.2 - 1.0	Flam. Gas 1 (H220) U Press. Gas U	-

The specific chemical identity and/or exact percentage of composition for one or more ingredients has been withheld as a trade secret.

Additional GHS classification or other information may be included in this section but has not been adopted by OSHA. See Section 16 for full text of H phrases.

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye Contact:

Rinse immediately with plenty of water for at least 15 minutes. Obtain medical attention immediately.

Skin Contact:

Not an expected route of exposure. Gas is not known to be absorbed through skin.

Ingestion:

Not an expected route of exposure. Gas is not known to be absorbed through skin.

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

Not applicable

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires.

Extinguishing Media to Avoid:

full water jet

Protective Equipment:

Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

Special Hazards:

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. This material is spontaneously flammable in air and may form explosive mixtures in air.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:

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.

Methods For Cleaning Up:

Remove sources of ignition. Evacuate area. If burning, allow to burn until leak is stopped.

References to other sections:

See Sections 8 and 13 for additional information.

7. HANDLING AND STORAGE

HANDLING

Precautions: Avoid release to the environment. Keep away from heat, sparks and open flame. - No smoking. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Wash hands thoroughly after handling. Wear protective gloves/clothing and eye/face protection. Do not breathe gas.

Special Handling Statements: Before dispensing product, purge equipment with an inert gas. 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.

STORAGE

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. Cylinders should never be stored where the temperatures will exceed 60 °C (140 °F). 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 140 °F

Reason: Safety.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:

Utilize a closed system process where feasible. Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:

In case of insufficient ventilation, wear suitable respiratory equipment. If exposed to vapour or spray, wear self-contained breathing apparatus. Continuously monitoring phosphine concentration in the workplace is recommended. Emergency procedure should be established for phosphine leaks.

Eye Protection:

Wear eye/face protection. Provide eye wash fountain and safety shower in close proximity to points of potential exposure.

Skin Protection:

Not an expected route of exposure. Gas is not known to be absorbed through skin. Steel toed safety shoes are recommended for anyone handling compressed gas cylinders.

Hand Protection:

Wear impermeable gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed.

Additional Advice:

Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

Exposure Limit(s)

The below constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

7803-51-2 Phosphine

OSHA (PEL):	0.3 ppm (TWA) 0.4 mg/m ³ (TWA)
ACGIH (TLV):	1 ppm (STEL) 0.3 ppm (TWA)
Other Value:	Not established

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colorless
Odor:	garlic
Boiling Point:	-87 °C -125 °F
Melting Point:	-133 °C -208 °F
Vapor Pressure:	502psig @ 20 °C
Specific Gravity/Density:	Not applicable
Vapor Density:	1.146(air = 1) @ 20 °C
Percent Volatile (% by wt.):	100
pH:	Not applicable
Saturation In Air (% By Vol.):	Not applicable
Evaporation Rate:	Not applicable
Solubility In Water:	27cc gas/100 ml @ 20 °C
Volatile Organic Content:	Not available
Flash Point:	(Pyrophoric)
Flammability (solid, gas):	Not available
Flammable Limits (% By Vol):	Lower: 1.8
Autoignition (Self) Temperature:	38 °C 100 °F
Decomposition Temperature:	Not available
Partition coefficient (n-octanol/water):	Not applicable
Odor Threshold:	Not available
Viscosity (Kinematic):	Not applicable

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/m ³):	Not applicable
Limiting Oxygen Concentration (LOC) (%):	Not applicable

10. STABILITY AND REACTIVITY

Reactivity: No information available

Stability: Stable

Conditions To Avoid: None known

Polymerization: Will not occur

Conditions To Avoid: None known

Materials To Avoid: Air, oxidizing agents.
Dimethylsulfoxide

Hazardous Decomposition Products: oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

PRODUCT TOXICITY INFORMATION

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

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 4 hr	0.079 mg/l
inhalation	rat	Acute LC50 4 hr	57 ppm

LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	skin	Thermal burn (pyrophoric)
Acute Irritation	eye	Thermal burn (pyrophoric)

ALLERGIC SENSITIZATION

Sensitization	skin	No data
Sensitization	respiratory	No data

GENOTOXICITY

Assays for Gene Mutations

Ames Salmonella Assay	No data
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OTHER INFORMATION

The product toxicity information above has been estimated.

HAZARDOUS INGREDIENT TOXICITY DATA

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

The ecological assessment for this material is based on an evaluation of its components.

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
Phosphine 7803-51-2	Not available	Not available	Not available
Hydrogen 1333-74-0	Not available	Not available	Not available

13. DISPOSAL CONSIDERATIONS

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 3 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The Company recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. The Company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

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

US DOT

Dangerous Goods? X

Proper Shipping Name: Phosphine

Hazard Class: 2.3

Subsidiary Class: 2.1

UN/ID Number: UN2199

Inhalation Hazard: Toxic Inhalation Hazard - Zone A

Transport Label Required: Poison Gas - Inhalation Hazard
 Flammable Gas

<u>Component / CAS No.</u>	<u>Hazardous Substances / Reportable Quantity of Product (lbs)</u>
Phosphine	101.0101

Comments: Hazardous Substances/Reportable Quantities - DOT requirements specific to Hazardous Substances only apply if the quantity in one package equals or exceeds the product reportable quantity.

TRANSPORT CANADA

Dangerous Goods? X

Proper Shipping Name: Phosphine

Hazard Class: 2.3

Subsidiary Class: 2.1

UN Number: UN2199

Transport Label Required: Toxic Gas
 Flammable Gas

ICAO / IATA

Dangerous Goods? Forbidden

IMO

Dangerous Goods? X

Proper Shipping Name: Phosphine

Hazard Class: 2.3
Subsidiary Class: 2.1
UN Number: UN2199
Transport Label Required: Toxic Gas
Flammable Gas

15. REGULATORY INFORMATION

Inventory Information

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.

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.

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 51209.

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.

OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
Phosphine 7803-51-2	97 - 99	500	100	Yes	No

FIFRA INFORMATION

This chemical is a pesticide product registered by the United States Environmental Protection Agency (EPA) and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

EPA Registration Number: 68387-8

DANGER - POISON (Skull and crossbones)

Restricted Use Pesticide (due to high acute inhalation toxicity of phosphine gas)

KEEP OUT OF REACH OF CHILDREN

Fatal if inhaled. The liquid may cause burns. This product is highly toxic to fish and wildlife. Phosphine gas may deaden the sense of smell. Phosphine may ignite spontaneously at levels above its lower flammability limit of 1.8% v/v (18,000 ppm). Ignition of high concentration of phosphine can produce an explosive reaction.

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Acute
- Fire
- Reactivity

16. OTHER INFORMATION**NFPA Hazard Rating (National Fire Protection Association)**

Health: 4 - Materials that, under emergency conditions, can be lethal.

Fire: 4 - Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air and which will burn readily.

Instability: 2 - Materials that readily undergo violent chemical change at elevated temperatures and pressures.

Reasons For Issue: Revised Section 1

Date Prepared: 02/05/2017

Date of last significant revision: 02/01/2017

Component Hazard Phrases

Phosphine

- H220 - Extremely flammable gas.
- H314 - Causes severe skin burns and eye damage.
- H330 - Fatal if inhaled.
- H400 - Very toxic to aquatic life.

Hydrogen

- H220 - Extremely flammable gas.

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