

**HONG KONG SPECIALTY GASES CO., LTD.**

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**MATERIAL
SAFETY
DATA SHEET**

PRODUCT NAME Phosphine	CAS# 7803-51-2
TRADE NAME AND SYNONYMS Phosphine	DOT I.D. NO. UN 2199
CHEMICAL NAME AND SYNONYMS Phosphine; Phosphorated Hydrogen, Hydrogen Phosphide	DOT HAZARD CLASS Division 2.3
ISSUE DATE AND REVISIONS Revised June 2000	FORMULA PH ₃

HEALTH HAZARD DATA

EMERGENCY OVERVIEW Phosphine is a poisonous, flammable, high pressure liquid and gas. It may cause fatal, lung, kidney, and central nervous system damage if inhaled. It is pyrophoric, which will ignite on contact with air and may form explosive mixtures with air.
SYMPTOMS OF EXPOSURE <u>Skin Contact:</u> Liquid may cause frostbite. <u>Inhalation:</u> Symptoms may include coughing, shortness of breath, wheezing, increased bronchial secretions and pulmonary edema; weakness, fatigue, headache, eye irritation, dizziness, fainting, drowsiness, tremors, disturbances of gait, convulsions, and coma; abdominal pain, thirst, nausea, and vomiting. Severe exposure may be lethal. <u>Eye Contact:</u> Liquid may cause frostbite or irreversible damage, gas may cause a burning sensation or irritation.
TOXICOLOGICAL PROPERTIES PEL/TLV 0.3 ppm LC ₅₀ 20 ppm STEL 1 ppm IDLH 200 ppm
RECOMMENDED FIRSTAID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PHOSPHINE. RESCUERS SHOULD BE EQUIPPED WITH ADEQUATE PERSONAL PROTECTIVE APPARATUS AND BE AWARE OF EXTREME FIRE AND EXPLOSION HAZARD. <u>Skin Contact:</u> If exposed to liquid avoid breathing vapor. Flush the frostbite area with warm water not hotter than 105 °F. Phosphorous pentoxide is a by-product of combusted Phosphine and is corrosive. Patient decontamination may be necessary. <u>Inhalation:</u> Remove patients to fresh air. Give artificial respiration if not breathing. Qualified personnel may give oxygen if breathing is difficult. <u>Eye Contact:</u> Immediately flush eyes with copious quantities of water and continue flushing for at least 15 minutes.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Frozen Phosphine is spontaneously flammable in cold air. At ordinary temperatures, Phosphine reacts explosively with oxygen and ignites on contact with halogens and nitric acid.

PHYSICAL DATA

BOILING POINT -125.99 °F	CRITICAL TEMPERATURE 124.9°F
MOLECULAR WEIGHT 34.04	CRITICAL PRESSURE 65.4 bar abs
SOLUBILITY IN WATER 0.036% by weight	DENSITY, GAS (70 °F, 1 atm) 1.53 g/ml
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR=1) 1.27 at 70°F
APPEARANCE AND ODOR Colorless gas with unpleasant, decaying, fish-like odor.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) Gas	AUTOIGNITION TEMPERATURE Phosphine is spontaneously combustible in air from room temperature upwards.	FLAMMABLE LIMITS % BY VOLUME LEL 1% UEL N/A
EXTINGUISHING MEDIA None		
SPECIAL FIRE FIGHTING PROCEDURES If possible, shut off the source of Phosphine and allow the fire to “burn” itself out. The products of combustion is phosphorus pentoxide which will begin to hydrolize and form phosphoric acid. Control the dispersion of phosphoric acid vapors with a water spray. Phosphoric acid vapors are less toxic than phosphine.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Recognize the potential for ground (water) contamination with phosphoric acid following a Phosphine “fire”. The cylinder can rupture under intense heat and/or flame.		

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID N/A
Unstable		
Stable	X	
INCOMPATIBILITY (Materials to avoid) Oxygen, halogens, nitric acid, chromium oxychloride, silver nitrate, mercuric nitrate and nitrogen trichloride.		
HAZARDOUS POLYMERIZATION		HAZARDOUS THERMAL DECOMPOSITION PRODUCTS Phosphorous and hydrogen at approximately 1100 °F.
May Occur		
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Wear Self-Contained Breathing Apparatus and protective clothing. If leak is in container or container valve, contact HSG for special advice.
WASTE DISPOSAL METHOD Waste disposal must be in accordance with appropriate Federal, State, and local regulations. For emergency disposal assistance, contact HSG for specific advice.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation.	OTHER N/A	SPECIAL N/A
PROTECTIVE GLOVES Neoprene or fire resistant gloves for fire protection		
EYE PROTECTION Safety goggles and glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash "fountain"		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION DOT Shipping Name: Phosphine DOT Shipping Label: Poison Gas and Flammable Gas		DOT Hazard Class: Division 2.3 I.D. No.: UN 2199
SPECIAL HANDLING RECOMMENDATIONS Use only in well-ventilated areas. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<583 psig) piping or system. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.		
SPECIAL STORAGE RECOMMENDATIONS Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in – first out" inventory system to prevent full cylinders being stored for excessive periods of time.		
OTHER RECOMMENDATIONS OR PRECAUTIONS Because of phosphine's extreme toxicity; local, state, and federal agencies recommend that a continuous monitoring analytical system with alarm be installed to monitor the atmosphere wherever Phosphine is being handled or used. Earth-ground and bond all lines and equipment associated with the Phosphine system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Law.		

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