



Emergency Contact: Chemtrec (800) 424-9300  
Or Norco (208) 336-1643

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Boise, ID 83705  
(208) 336-1643

## Phosphine in Nitrogen 0.1PPM to 100 PPM

### MATERIAL SAFETY DATA SHEET

#### Identification

Product Name: Phosphine in Nitrogen 0.1 PPM to 100 PPM  
CAS Number: N/A  
Chemical Family: Gas Mixture  
Chemical Formula:  $\text{PH}_3$  0.1PPM to 100 PPM in Nitrogen  
Common Names/Synonyms: None  
TDG (Canada) Classification: 2.2  
WHMIS Classification: A, D2B  
MSDS Identification Code/Number: 2410  
Prepared By: Quality Dept.

Revision Date: 11/4/02  
Last Review Date: 04/09/12

#### Composition/Information on Ingredients

##### Exposure Limits<sup>1</sup>:

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> OR LC <sub>50</sub> Route/Species
Phosphine FORMULA: $\text{PH}_3$ CAS #: 7803-51-2 RTECS #: SY7525000	0.1 PPM to 100 PPM	0.3 PPM	0.3 PPM TWA 1 PPM STEL	LC <sub>50</sub> : 20 PPM inhalation/rat (1 Hr. time adjusted)
Nitrogen FORMULA: $\text{N}_2$ CAS #: 7727-37-9 RTECS #: QW9700000	99.9995% to 100%	Not Available	Not Available	Simple Asphyxiant

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910.1000, 1994

<sup>3</sup> As stated in the ACGIH 2007 the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) booklet.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

IDLH: 50 PPM (phosphine)

#### Hazards Identification

##### Emergency Overview:

Non-flammable gas with slight unpleasant odor. Gas mixture may be irritating to the skin, eyes, and mucous membranes. Inhalation may result in pulmonary edema, central nervous system (CNS) depression and kidney toxicity. Contents under pressure. Use and store below 125°F (52°C).

##### Route of Entry:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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**Health Effects**

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None known		

**Carcinogenicity:** NTP: No IARC: No OSHA: No

**Eye Effects:**

Contact may cause eye irritation. Contact with rapidly expanding gas near the point of release may cause frostbite.

**Skin Effects:**

Phosphine may combine with moisture on the skin to form small amounts of phosphoric acid which may cause pain, burning and irritation. Contact with rapidly expanding gas near the point of release may cause frostbite.

**Ingestion Effects:**

Accidental ingestion is unlikely as at ambient temperature and pressure (NTP) this product is a gas.

**Inhalation Effects:**

Inhalation may cause irritation, coughing, shortness of breath, wheezing, increased bronchial secretions and pulmonary edema. Serious effects may be produced by exposure to 5-10 PPM for several hours. Pulmonary edema may be delayed following an asymptomatic period.

Phosphine is also toxic to CNS. Exposure symptoms may include weakness, fatigue, headache, dizziness, fainting, drowsiness, tremors, disturbances of gait, convulsions, and coma. Abdominal pain, thirst, nausea, and vomiting may also occur. Exposure may result in toxicity to the kidneys.

Nitrogen acts as a simple asphyxiant displacing the oxygen content in the air necessary for life.

**Medical Conditions Aggravated By Exposure:**

May aggravate pre-existing respiratory, kidney, and nervous system disorders.

**NFPA Hazard Codes**

Health: 1  
Flammability: 0  
Instability: 0

**HMIS Hazard Codes**

Health: 1  
Flammability: 0  
Physical Hazard: 3

**Ratings System**

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

**First Aid Measures**

**Eyes:**

Immediately flush eyes with large amounts of water for at least 15 minutes opening and closing eyelids to ensure adequate rinsing. If irritation persists or systemic poisoning is suspected, seek immediate medical attention. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

**Skin:**

Remove contaminated clothing and flush affected area with large quantities of water. If irritation persists or systemic poisoning is suspected, seek immediate medical attention. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

**Ingestion:**

Unlikely; product is a gas.

**Inhalation:**

PROMPT REMOVAL FROM THE CONTAMINATED AREA AND IMMEDIATE MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE AWARE OF THE HEALTH HAZARDS ASSOCIATED WITH PHOSPHINE.

Quick removal from the contaminated area is most important. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and given artificial resuscitation and supplemental oxygen if they are not breathing. Further treatment should be symptomatic and supportive. Delayed pulmonary edema may occur.

<b>Fire Fighting Measures</b>
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Conditions of Flammability: Not flammable		
Flash Point: None	Method: Not Applicable	Autoignition Temperature: None
LEL (%): None		UEL (%): None
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

**Fire and Explosion Hazards:**

The majority of this product constitutes a nonflammable inert gas. Phosphine is present in concentrations below the Lower Explosive Limits (LEL). Cylinders may rupture or explode from pressure when involved in a fire situation.

**Extinguishing Media:**

Water spray to keep cylinders cool. Extinguishing agent appropriate for the combustible material.

**Fire Fighting Instructions:**

Continue to cool heat or flame exposed containers until well after the flames are extinguished. Firefighters should wear a full-facepiece, NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

<b>Accidental Release Measures</b>
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Isolate hazard area, evacuate personnel and deny entry to unauthorized/unprotected individuals. Use appropriate protective equipment including respiratory protection for high or unknown concentrations. Personnel should not re-enter hazard area until phosphine is dispersed and adequate atmospheric oxygen is re-established. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco location.

<b>Handling and Storage</b>
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**Electrical Classification:**

Non-hazardous

Use only in well-ventilated areas. Valve protection caps must remain in place unless container 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 (<3000 psig) piping systems. 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 backflow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125<sup>o</sup> F. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in, first out" inventory system to prevent full cylinders being stored for excessive period of time.

For additional recommendations, consult Compressed Gas Association's Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

### Exposure Controls, Personal Protection

**Engineering Controls:**

Use local exhaust ventilation as necessary to maintain atmospheric oxygen levels above 19.5% and control air contaminants to below acceptable exposure guidelines. Phosphine is heavier than air so venting areas from the bottom or floor may be more effective.

**Eye/Face Protection:**

Goggles should be worn.

**Skin Protection:**

Protective gloves made of suitable material appropriate for the job.

**Respiratory Protection:**

A NOISH/MSHA approved SCBA or any supplied air respirator with a full facepiece and operated in a positive pressure mode should be available for emergency use or exposure. Respirators should be stored in an area not likely to be contaminated.

**Other/General Protection:**

Safety shoes, emergency eyewash station.

### Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Above critical temp.	
Vapor density (Air = 1)	: Not Available	
Evaporation point	: Not Available	
Boiling point	: Not Available	°C
Freezing point	: Not Available	
pH	: Not Available	
Specific gravity at STP	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H <sub>2</sub> O)	: Slight to Negligible	
Odor threshold	: 0.51 ppm	(As phosphine)
Odor and appearance	: Colorless gas/vapor. Unpleasant odor of decaying fish.	

### Stability and Reactivity

**Stability:**

Stable

**Conditions to Avoid:**

Avoid heat, flames, ignition sources, and oxidizing agents.

**Incompatible Materials:**

The majority of this product is an inert gas however phosphine can react violently with oxygen, halogens, nitric acid, chromium oxychloride, silver nitrate, mercuric nitrate and nitrogen chloride.

**Hazardous Decomposition Products:**

Trace amounts of phosphorus and hydrogen will evolve at approximately 1100<sup>0</sup>F. (600<sup>0</sup>C).

**Hazardous Polymerization:**

Will not occur.

### Toxicological Information

**Skin and Eye:**

May cause irritation

**Inhalation:**

Respiratory, gastrointestinal, and central nervous system (CNS) symptoms were noted in workers exposed to mean phosphine concentrations less than 10 PPM. A 4 hour LC<sub>50</sub> for rats of 11 PPM is cited in the ACGIH Documentation of TLVs and BEIs.

**Chronic:**

Chronic phosphine poisoning is believed to be similar to chronic phosphorus poisoning (skeletal injury) although no cases are documented in the literature. Chronic absorption of phosphine may be associated with disturbances of sight, speech, and motor functions.

**Other:**

Phosphine is toxic to the kidneys. Exposure may result in albuminuria and hematuria.

### Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Will not bio concentrate.

### Disposal Considerations

Do not attempt to dispose of waste or unused quantities in refillable cylinders. Return in the shipping container *properly labeled with any valve outlet plugs or caps secure and valve protection cap in place* to Norco for proper disposal. Non refillable cylinders may be safely vented outdoors and disposed of in accordance with State and/or local regulations or return to NorLab for disposal.

### Transport Information

PARAMETER	United States DOT	Canada TDG
<b>Proper Shipping Name:</b>	Compressed Gas, N.O.S., (Phosphine, Nitrogen)	Compressed Gas, N.O.S.,
<b>Hazard Class:</b>	2.2	2.2
<b>Identification Number</b>	1956	1956
<b>Shipping label:</b>	Non-flammable gas	Non-flammable gas

### Regulatory Information

**SARA Title III Notification and Information:**

This product contains phosphine (CAS No.:7803-51-2) which is listed under SARA 313, under SARA 304, CERCLA with a reportable quantity of 100 pounds, and is a SARA 302, Extremely Hazardous Substance with a Threshold Planning Quantity of 500 pounds.

**SARA Title III – Hazard Classes:**

Acute Health Hazard  
Chronic Health Hazard  
Sudden Release of Pressure Hazard

<b>Other Information</b>
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Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

**Disclaimer of Expressed and Implied Warranties:**

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).