



## Safety Data Sheet

**Material Name: 0.67% - <2% Phosphine in Hydrogen****SDS ID: 00244514**

### Section 1 - PRODUCT AND COMPANY IDENTIFICATION

**Material Name**

0.67% - &lt;2% Phosphine in Hydrogen

**Product Use**

Industrial and Specialty Gas Applications.

**Restrictions on Use**

None known.

**Details of the supplier of the safety data sheet**

MATHESON TRI-GAS, INC.

150 Allen Road, Suite 302

Basking Ridge, NJ 07920

General Information: 1-800-416-2505

Emergency #: 1-800-424-9300 (CHEMTREC)

Outside the US: 703-527-3887 (Call collect)

### Section 2 - HAZARDS IDENTIFICATION

**Classification in accordance with paragraph (d) of 29 CFR 1910.1200.**

Flammable Gases - Category 1

Gases Under Pressure - Compressed gas

Acute Toxicity - Inhalation - Gas - Category 3

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

Specific target organ toxicity - Single exposure - Category 1

Specific target organ toxicity - Repeated exposure - Category 1

Hazardous to the Aquatic Environment - Acute - Category 3

**GHS Label Elements****Symbol(s)****Signal Word**

Danger

**Hazard Statement(s)**

Extremely flammable gas.

Contains gas under pressure; may explode if heated.

Toxic if inhaled.

May displace oxygen and cause rapid suffocation.

Causes skin irritation.

Causes serious eye irritation.

Causes damage to organs. (Cardiovascular system , digestive system , liver , nervous system , respiratory system )

Causes damage to nervous system and respiratory system through prolonged or repeated exposure.

Harmful to aquatic life.

**Precautionary Statement(s)****Prevention**



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Keep away from heat, sparks, open flame, and hot surfaces - No smoking.  
Do not breathe gas.  
Use only outdoors or in a well-ventilated area.  
Do not eat, drink or smoke when using this product.  
Wear protective gloves and eye/face protection.  
Wash thoroughly after handling.  
Avoid release to the environment.

**Response**

Leaking gas fire.  
Do not extinguish, unless leak can be stopped safely.  
Eliminate all ignition sources if safe to do so.  
If exposed: Call a POISON CENTER or doctor/physician.  
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
Call a POISON CENTER or doctor/physician.  
Specific treatment may be needed, see first aid section of Safety Data Sheet.  
IF ON SKIN: Wash with plenty of soap and water.  
If skin irritation occurs: Get medical advice/attention.  
Take off contaminated clothing and wash before reuse.  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.  
Continue rinsing.  
If eye irritation persists: Get medical advice/attention.

**Storage**

Store in a well-ventilated place.  
Protect from sunlight.  
Keep container tightly closed.  
Store locked up.

**Disposal**

Dispose in accordance with all applicable regulations.

**Other Hazards**

Rapid release of compressed gas may cause frostbite.

**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

CAS	Component Name	Percent
1333-74-0	Hydrogen	>98
7803-51-2	Phosphine	0.67-1.9

**Section 4 - FIRST AID MEASURES**

**Inhalation**

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Skin**

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

**Eyes**

Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.



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**Material Name: 0.67% - <2% Phosphine in Hydrogen****SDS ID: 00244514****Ingestion**

If swallowed, get medical attention.

**Most Important Symptoms/Effects****Acute**

frostbite, suffocation, skin irritation, eye irritation, cardiovascular system damage, digestive tract damage, liver damage, nervous system damage, respiratory system damage

**Delayed**

nervous system damage, respiratory system damage

**Note to Physicians**

For inhalation, consider oxygen.

**Section 5 - FIRE FIGHTING MEASURES****Extinguishing Media****Suitable Extinguishing Media**

regular dry chemical, carbon dioxide, water spray, alcohol resistant foam, Large fires: water spray or fog, alcohol-resistant foam

**Unsuitable Extinguishing Media**

None known.

**Special Hazards Arising from the Chemical**

Severe fire hazard. Severe explosion hazard. Gas/air mixtures are explosive. Containers may rupture or explode if exposed to heat. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

**Hazardous Combustion Products**

oxides of phosphorus, PHOSPHORUS

**Fire Fighting Measures**

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 500 meters (1/3 mile). Consider downwind evacuation if material is leaking. Stop flow of gas.

**Special Protective Equipment and Precautions for Firefighters**

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

**Section 6 - ACCIDENTAL RELEASE MEASURES****Personal Precautions, Protective Equipment and Emergency Procedures**

Wear personal protective clothing and equipment, see Section 8.

**Methods and Materials for Containment and Cleaning Up**

Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Avoid heat, flames, sparks and other sources of ignition. All equipment used when handling the product must be grounded. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering.

**Environmental Precautions**

Avoid release to the environment.



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**Section 7 - HANDLING AND STORAGE**

**Precautions for Safe Handling**

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Do not breathe gas. Use only outdoors or in a well-ventilated area. Do not eat, drink or smoke when using this product. Wear protective gloves/eye protection/face protection. Wash hands thoroughly after handling. Avoid release to the environment.

**Conditions for Safe Storage, Including any Incompatibilities**

Store in a well-ventilated place.

Protect from sunlight.

Keep container tightly closed.

Store locked up.

Store and handle in accordance with all current regulations and standards. Store in a tightly closed container.

Compressed gases can present significant safety hazards. Store in a cool, dry place. Store in a well-ventilated area.

Avoid direct sunlight. Protect from physical damage. Cylinders should be stored upright (with valve protection cap in place). Store cylinders away from heavily trafficked areas and emergency exits. Do not store above 125 °F (52 °C). Keep locked up. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

**Incompatible Materials**

metals, oxidizing materials, metal oxides, combustible materials, halogens, metal salts, halo carbons, lithium, Acids

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

<b>Hydrogen</b>	<b>1333-74-0</b>
ACGIH:	(See Appendix F: Minimal Oxygen Content, explosion hazard )
<b>Phosphine</b>	<b>7803-51-2</b>
ACGIH:	0.3 ppm TWA
	1 ppm STEL
NIOSH:	0.3 ppm TWA ; 0.4 mg/m3 TWA
	1 ppm STEL ; 1 mg/m3 STEL
	50 ppm IDLH
Europe:	0.1 ppm TWA ; 0.14 mg/m3 TWA
	0.2 ppm STEL ; 0.28 mg/m3 STEL
OSHA (US):	0.3 ppm TWA ; 0.4 mg/m3 TWA
Mexico:	0.3 ppm TWA VLE-PPT ; 0.4 mg/m3 TWA VLE-PPT
	1 ppm STEL [PPT-CT ] ; 1 mg/m3 STEL [PPT-CT ]

**ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)**

There are no biological limit values for any of this product's components.



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**Engineering Controls**

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Individual Protection Measures, such as Personal Protective Equipment**

**Eye/face protection**

Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**Skin Protection**

For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.

**Respiratory Protection**

Phosphine: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 3 ppm. Any supplied-air respirator. 7.5 ppm. Any supplied-air respirator operated in a continuous-flow mode. 15 ppm. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern. Any self-contained breathing apparatus with a full facepiece. Any supplied-air respirator with a full facepiece. 50 ppm. Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Escape -. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern. Any appropriate escape-type, self-contained breathing apparatus.

**Glove Recommendations**

For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves.

**Section 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance</b>	colorless gas	<b>Physical State</b>	gas
<b>Odor</b>	fishy odor ,(phosphine)	<b>Color</b>	colorless
<b>Odor Threshold</b>	Not available	<b>pH</b>	Not available
<b>Melting Point</b>	-259 °C (-434 °F Hydrogen )	<b>Boiling Point</b>	-253 °C (-423 °F Hydrogen )
<b>Boiling Point Range</b>	Not available	<b>Freezing point</b>	Not available
<b>Evaporation Rate</b>	Not available	<b>Flammability (solid, gas)</b>	Not available
<b>Autoignition Temperature</b>	500 °C (932 °F Hydrogen )	<b>Flash Point</b>	(Flammable )
<b>Lower Explosive Limit</b>	4 % (Hydrogen )	<b>Decomposition temperature</b>	Not available
<b>Upper Explosive Limit</b>	75 % (Hydrogen )	<b>Vapor Pressure</b>	Not available



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<b>Vapor Density (air=1)</b>	0.07 (Hydrogen )	<b>Specific Gravity (water=1)</b>	Not available
<b>Water Solubility</b>	1.82 % (@ 20 °C Hydrogen )	<b>Partition coefficient: n-octanol/water</b>	Not available
<b>Viscosity</b>	Not available	<b>Kinematic viscosity</b>	Not available
<b>Solubility (Other)</b>	Not available	<b>Density</b>	0.0899 g/L (Hydrogen )
<b>Physical Form</b>	compressed gas	<b>Molecular Weight</b>	Not available

### Section 10 - STABILITY AND REACTIVITY

**Reactivity**

No reactivity hazard is expected.

**Chemical Stability**

Stable at normal temperatures and pressure.

**Possibility of Hazardous Reactions**

Will not polymerize.

**Conditions to Avoid**

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid direct sunlight. Containers may rupture or explode if exposed to heat.

**Incompatible Materials**

metals, oxidizing materials, metal oxides, combustible materials, halogens, metal salts, halo carbons, lithium, Acids

**Hazardous decomposition products**

oxides of phosphorus, PHOSPHORUS

### Section 11 - TOXICOLOGICAL INFORMATION

**Information on Likely Routes of Exposure****Inhalation**

nausea, vomiting, difficulty breathing, irregular heartbeat, headache, fatigue, dizziness, Disorientation, mood swings, tingling sensation, loss of coordination, convulsions, Unconsciousness, coma, irritation, cough, nosebleed, garlic breath, changes in body temperature, changes in blood pressure, tearing, diarrhea, stomach pain, drowsiness, emotional disturbances, tremors, visual disturbances, dilated pupils, bluish skin color, lung congestion, blood disorders, heart damage, kidney damage, liver damage, paralysis, death, chest pain, difficulty speaking, nerve damage, brain damage

**Skin Contact**

frostbite, irritation, blisters

**Eye Contact**

frostbite, irritation, blurred vision

**Ingestion**

ingestion of a gas is unlikely

**Acute and Chronic Toxicity****Component Analysis - LD50/LC50**

The components of this material have been reviewed in various sources and the following selected endpoints are published:

**Hydrogen (1333-74-0)**

Inhalation LC50 Rat &gt;15000 ppm 1 h

**Phosphine (7803-51-2)**

Inhalation LC50 Rat 11 ppm 4 h



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**Product Toxicity Data**

**Acute Toxicity Estimate**

No data available.

**Immediate Effects**

frostbite, suffocation, skin irritation, eye irritation, cardiovascular system damage, digestive tract damage, liver damage, nervous system damage, respiratory system damage

**Delayed Effects**

nervous system damage, respiratory system damage

**Irritation/Corrosivity Data**

skin irritation, eye irritation

**Respiratory Sensitization**

No data available.

**Dermal Sensitization**

No data available.

**Component Carcinogenicity**

None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA.

**Germ Cell Mutagenicity**

No data available.

**Tumorigenic Data**

No data available

**Reproductive Toxicity**

No data available for the mixture.

**Specific Target Organ Toxicity - Single Exposure**

Cardiovascular system, digestive system, liver, nervous system, Respiratory system

**Specific Target Organ Toxicity - Repeated Exposure**

nervous system, Respiratory system

**Aspiration hazard**

Not applicable.

**Medical Conditions Aggravated by Exposure**

respiratory disorders, kidney disorders, liver disorders, nervous system disorders, skin disorders

**Section 12 - ECOLOGICAL INFORMATION**

**Ecotoxicity**

Harmful to aquatic life.

**Component Analysis - Aquatic Toxicity**

No LOEI ecotoxicity data are available for this product's components.

**Persistence and Degradability**

No data available for the mixture.

**Bioaccumulative Potential**

No data available for the mixture.

**Mobility**

No data available for the mixture.

**Section 13 - DISPOSAL CONSIDERATIONS**

**Disposal Methods**

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D001.

**Component Waste Numbers**

The U.S. EPA has not published waste numbers for this product's components.



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**Section 14 - TRANSPORT INFORMATION**

**US DOT Information:**

**Shipping Name:** COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. , ( Contains: Hydrogen , Phosphine )

**Hazard Class:** 2.3

**UN/NA #:** UN1953

**Required Label(s):** 2.3 2.1

**IMDG Information:**

**Shipping Name:** COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. , ( Contains: Hydrogen , Phosphine )

**Hazard Class:** 2.3

**UN#:** UN1953

**Required Label(s):** 2.3 2.1

**International Bulk Chemical Code**

This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

**Section 15 - REGULATORY INFORMATION**

**U.S. Federal Regulations**

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

<b>Phosphine</b>	<b>7803-51-2</b>
SARA 302:	500 lb TPQ
SARA 313:	1 % de minimis concentration
CERCLA:	100 lb final RQ ; 45.4 kg final RQ
OSHA (safety):	100 lb TQ
SARA 304:	100 lb EPCRA RQ

**SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories**

Flammable; Gas Under Pressure; Acute toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

**U.S. State Regulations**

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
<b>Hydrogen</b>	<b>1333-74-0</b>	Yes	Yes	Yes	Yes	Yes
<b>Phosphine</b>	<b>7803-51-2</b>	Yes	Yes	Yes	Yes	Yes

**Not listed under California Proposition 65**

**Canada Regulations**

**Canadian WHMIS Ingredient Disclosure List (IDL)**



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Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

<b>Phosphine</b>	<b>7803-51-2</b>
	1 %

**Component Analysis - Inventory****Hydrogen (1333-74-0)**

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

**Phosphine (7803-51-2)**

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No

**Section 16 - OTHER INFORMATION****NFPA Ratings**

Health: 3 Fire: 4 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

**Summary of Changes**

Updated: 05/01/2015

**Key / Legend**

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania\*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH -



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Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

### **Other Information**

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