Ehsan International Gases

# Phosphine

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**MATHESON TRI-GAS, INC.**
**150 Allen Road Suite 302**
**Basking Ridge, New Jersey 07920**
**Information: 1-800-416-2505**

**Emergency Contact:**
**CHEMTREC 1-800-424-9300**
**Calls Originating Outside the US:**
**703-527-3887 (Collect Calls Accepted)**

**SUBSTANCE: SDS® 1 PHOSPHINE**

**TRADE NAMES/SYNONYMS:**
RCRA P096; UN 2199; PHOSPHINE STORAGE AND DELIVERY SYSTEM (SAFE DELIVERY SOURCE); SDS PHOSPHINE 1; SDS FOR PHOSPHINE; MATNE521

**CHEMICAL FAMILY:** hydrides

**CREATION DATE:** Mar 30 1998
**REVISION DATE:** Dec 11 2008

**Manufacturer / Distributor:**

**Ehsan International Gases**
40/9, Aurangabad, Nazimabad
#3, Karachi 74600, Pakistan.
+92 21 36612091 – 36612907
info@ehsan.com.pk
www.ehsan.com.pk

## 2. COMPOSITION, INFORMATION ON INGREDIENTS

**COMPONENT:** PHOSPHINE
**CAS NUMBER:** 7803-51-2
**PERCENTAGE:** >1

**COMPONENT:** MOLECULAR SIEVE
**CAS NUMBER:** Not assigned.
**PERCENTAGE:** >1

# Phosphine

## 3. HAZARDS IDENTIFICATION

**NFPA RATINGS (SCALE 0-4):** HEALTH=4 FIRE=4 REACTIVITY=2

**EMERGENCY OVERVIEW:**
**PHYSICAL FORM:** Solid beads contained within a sealed stainless steel cylinder. When exposed to room air, these beads release phosphine, a toxic, colorless gas.
**ODOR:** fishy odor
**MAJOR HEALTH HAZARDS:** The toxicological properties of the molecular sieve have not been fully investigated. In normal use, no exposure to or contact with the SDS molecular sieve beads would be expected to occur. The stainless steel cylinder should not be opened or tampered with. If the SDS is opened, the hazard would be exposure to phosphine. Phosphine is extremely poisonous and may be fatal if inhaled.
Hazards below refer to phosphine exposure.
**PHYSICAL HAZARDS:** Flammable gas. May cause flash fire.

**POTENTIAL HEALTH EFFECTS:**
**INHALATION:**
**SHORT TERM EXPOSURE:** irritation, cough, nosebleed, garlic breath, changes in body temperature, changes in blood pressure, tearing, nausea, vomiting, diarrhea, stomach pain, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, emotional disturbances, tingling sensation, tremors, loss of coordination, visual disturbances, dilated pupils, bluish skin color, lung congestion, blood disorders, heart damage, kidney damage, liver damage, paralysis, convulsions, unconsciousness, coma, death
**LONG TERM EXPOSURE:** cough, nausea, vomiting, diarrhea, chest pain, difficulty breathing, headache, dizziness, difficulty speaking, visual disturbances, lung congestion, blood disorders, heart damage, nerve damage, brain damage
**SKIN CONTACT:**
**SHORT TERM EXPOSURE:** blisters, frostbite
**LONG TERM EXPOSURE:** no information on significant adverse effects **EYE CONTACT:**
**SHORT TERM EXPOSURE:** frostbite, blurred vision
**LONG TERM EXPOSURE:** no information on significant adverse effects **INGESTION:**
**SHORT TERM EXPOSURE:** ingestion of harmful amounts is unlikely
**LONG TERM EXPOSURE:** ingestion of harmful amounts is unlikely

## 4. FIRST AID MEASURES

**INHALATION:** It is unlikely that emergency treatment will be required. However, in case of contact with media remove to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

**SKIN CONTACT:** It is unlikely that emergency treatment will be required. However, in case material has been released or spilled, wash if needed. If frostbite, freezing or cryogenic burns occur, warm affected area in warm water. If this is not available, gently wrap affected parts in blankets. Allow circulation to return naturally. Get medical attention immediately.

**EYE CONTACT:** It is unlikely that emergency treatment will be required. However, in case material has been released or spilled, wash with large amounts of water or normal saline until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

**INGESTION:** If a large amount is swallowed, get medical attention.

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## 5. FIRE FIGHTING MEASURES

**FIRE AND EXPLOSION HAZARDS:** The molecular sieve is noncombustible. However, phosphine is a severe fire hazard, and may ignite on exposure to air. Vapor/air mixtures are explosive. Containers may rupture or explode if exposed to heat.

**EXTINGUISHING MEDIA:** Let burn unless leak can be stopped immediately.

Large fires: Use regular foam or flood with fine water spray.

**FIRE FIGHTING:** 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: Evacuation radius: 800 meters (1/2 mile).

**LOWER FLAMMABLE LIMIT:** 1% (PHOSPHINE)
**AUTOIGNITION:** 212 F (100 C) (PHOSPHINE)

## 6. ACCIDENTAL RELEASE MEASURES

**OCCUPATIONAL RELEASE:**
Avoid heat, flames, sparks and other sources of ignition. 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. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

## 7. HANDLING AND STORAGE

**STORAGE:** Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355 Part B).

**HANDLING:** Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE LIMITS:**
**PHOSPHINE:**
0.3 ppm (0.4 mg/m3) OSHA TWA
1 ppm (1 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
0.3 ppm ACGIH TWA

1 ppm ACGIH STEL
0.3 ppm (0.4 mg/m3) NIOSH recommended TWA 10 hour(s)
1 ppm (1 mg/m3) NIOSH recommended STEL

**VENTILATION:** Not required during normal system use. In the event of system rupture and the release of phosphine: Provide local exhaust or process enclosure ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** Not required during normal system use. In the event of system rupture and the release of phosphine: For the gas: Eye protection not required, but recommended. For the liquid: 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.

**CLOTHING:** Not required during normal system use. In the event of system rupture and the release of phosphine: For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

**GLOVES:** Not required during normal system use. In the event of system rupture and the release of phosphine: Wear insulated gloves.

**RESPIRATOR:** Not required during normal system use. In the event of system rupture and the release of 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 positivepressure mode in combination with an auxiliary selfcontained breathing apparatus operated in pressuredemand 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.
**For Unknown Concentrations or Immediately Dangerous to Life or Health -**
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positivepressure mode in combination with an auxiliary selfcontained breathing apparatus operated in pressuredemand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** gas
**PHYSICAL FORM:** Solid beads contained within a sealed stainless steel cylinder. When exposed to room air, these beads release phosphine, a toxic, colorless gas.
**ODOR:** fishy odor
**BOILING POINT:** -126 F (-87.7 C) (PHOSPHINE)
**FREEZING POINT:** -209 F (-134 C) (PHOSPHINE)
**VAPOR PRESSURE:** <=15 psi

**VAPOR DENSITY (air=1):** 1.14 (PHOSPHINE) approximate
**SPECIFIC GRAVITY:** Not applicable
**DENSITY:** 1 g/mL approximate
**WATER SOLUBILITY:** 26% @ 17 C (PHOSPHINE)
**PH:** Not applicable
**VOLATILITY:** Not applicable
**ODOR THRESHOLD:** Not available
**EVAPORATION RATE:** Not applicable
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable

## 10. STABILITY AND REACTIVITY

**REACTIVITY:** Stable at normal temperatures and pressure. However, phosphine may ignite on exposure to air.

**CONDITIONS TO AVOID:** Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

**INCOMPATIBILITIES:** acids, halogens, oxidizing materials, halo carbons

**HAZARDOUS DECOMPOSITION:**
Thermal decomposition products: oxides of phosphorus

**POLYMERIZATION:** Will not polymerize.

## 11. TOXICOLOGICAL INFORMATION

**SDS® 1 PHOSPHINE:**
**ADDITIONAL DATA:** The toxicological properties of the molecular sieve have not been fully investigated.
In normal use, no exposure to or contact with the SDS molecular sieve beads would be expected to occur. The stainless steel cylinder should not be opened or tampered with.

**PHOSPHINE:**
**TOXICITY DATA:** 11 ppm/4 hour(s) inhalation-rat LC50 **LOCAL EFFECTS:**
Irritant: inhalation
**ACUTE TOXICITY LEVEL:**
Highly Toxic: inhalation
**TARGET ORGANS:** central nervous system **MUTAGENIC DATA:**
Available.

## 12. ECOLOGICAL INFORMATION

Not available

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## 13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.
Hazardous Waste Number(s): D003.

## 14. TRANSPORT INFORMATION


**U.S. DOT 49 CFR 172.101:**

**PROPER SHIPPING NAME:** Phosphine

**ID NUMBER:** UN2199

**HAZARD CLASS OR DIVISION:** 2.3

**LABELING REQUIREMENTS:** 2.3; 2.1

**QUANTITY LIMITATIONS:**
**PASSENGER AIRCRAFT OR RAILCAR:** Forbidden
**CARGO AIRCRAFT ONLY:** Forbidden
**ADDITIONAL SHIPPING DESCRIPTION:** Toxic-Inhalation Hazard Zone A

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:**
**SHIPPING NAME:** Phosphine
**UN NUMBER:** UN2199
**CLASS:** 2.3; 2.1

## 15. REGULATORY INFORMATION

**U.S. REGULATIONS:**
**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): PHOSPHINE:** 100 LBS RQ

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B):**
**PHOSPHINE:** 500 LBS TPQ

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C):**
**PHOSPHINE:** 100 LBS RQ

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):**
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: Yes

**SARA TITLE III SECTION 313 (40 CFR 372.65):**
**PHOSPHINE**

**OSHA PROCESS SAFETY (29 CFR 1910.119):**
**PHOSPHINE:** 100 LBS TQ

**STATE REGULATIONS:**
**California Proposition 65:** Not regulated.

**CANADIAN REGULATIONS:**
**WHMIS CLASSIFICATION:** Not determined.

**NATIONAL INVENTORY STATUS:**
**U.S. INVENTORY (TSCA):** All components of this product are in compliance.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

**CANADA INVENTORY (DSL/NDSL):** Not determined.

## 16. OTHER INFORMATION

**MATHESON TRI-GAS, INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES, GUARANTEES OR REPRESENTATIONS REGARDING THE PRODUCT OR THE INFORMATION HEREIN, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE. MATHESON TRI-GAS, INC. SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE, WHETHER COMPENSATORY, CONSEQUENTIAL, EXEMPLARY, OR OTHERWISE, RESULTING FROM ANY PUBLICATION, USE OR RELIANCE UPON THE INFORMATION HEREIN**