

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

1 Identification of substance

- **Product details**

- **Trade name: Phosphine**

- **Article number:** 008-01-0011

- **Creation date:** 05/23/2006

- **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Please ensure that this MSDS is received by the appropriate person.

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER:

CHEMTREC (800) 424-9300

- **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

- **Chemical characterization:**

- **CAS No. Description**

7803-51-2 phosphine

- **Identification number(s)**

- **EINECS Number:** 232-260-8

015-181-00-1

3 Hazards identification

- **Hazard description:**



Very toxic

Extremely flammable

Dangerous for the environment

- **WHMIS-symbols:**

A - Compressed gas

D1A - Very toxic material causing immediate and serious toxic effects

B6 - Reactive flammable material



- **HMIS-ratings (scale 0 - 4)**

HEALTH	4	Health = 4
--------	---	------------

FIRE	4	Fire = 4
------	---	----------

REACTIVITY	3	Reactivity = 3
------------	---	----------------

(Contd. on page 2)

CDN

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 1)

· NFPA ratings (scale 0 - 4)



Health = 4
Fire = 4
Reactivity = 3

· Information pertaining to particular dangers for man and environment:

Extremely flammable.
Spontaneously flammable in air.
Very toxic by inhalation.
Causes burns.
Very toxic to aquatic organisms.

· Classification system:

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

· GHS label elements

**Danger**

2.2/1 - Extremely flammable gas.

**Danger**

3.1/1 - Fatal if inhaled.

**Danger**

3.2/1B - Causes severe skin burns and eye damage.

**Warning**

2.5/L - Contains gas under pressure; may explode if heated.

**Warning**

4.1/1 - Very toxic to aquatic life.

· Prevention:

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.
Wear respiratory protection.

· Response:

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

(Contd. on page 3)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 2)

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

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

Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment is urgent (see label).

Specific treatment (see label).

Wash contaminated clothing before reuse.

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

Eliminate all ignition sources if safe to do so.

Collect spillage.

· **Storage:**

Store in a well-ventilated place.

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

· **Disposal:**

Dispose of contents/container in accordance with local/regional/national/international regulations.

* 4 First aid measures

· **General information:**

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· **After inhalation:**

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably on the body side position.

· **After skin contact:** Immediately wash with water and soap and rinse thoroughly for at least 15 minutes.

· **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.

· **After swallowing:** Not applicable

* 5 Fire fighting measures

· **Suitable extinguishing agents:**

CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· **Protective equipment:** Wear self-contained respiratory protective device.

* 6 Accidental release measures

· **Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation.

Eliminate ignition sources

Stop leak - ONLY if possible to do so without risk.

· **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.

· **Measures for cleaning/collecting:**

Use neutralizing agent.

(Contd. on page 4)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 3)

Dispose contaminated material as waste according to item 13.
 Ensure adequate ventillation.

* 7 Handling and storage

- **Handling:** Do not mix with air or oxygen above atmospheric pressure.
- **Information for safe handling:**
 - Ensure good ventilation/exhaustion at the workplace.
 - Open and handle cylinder with care.
 - Handle with care. Avoid jolting, friction, and impact.
 - Use only in well ventilated areas.
 - Store cylinders upright with valve protection cap in place and firmly secured to prevent falling or being knocked over.
- **Information about protection against explosions and fires:**
 - Keep ignition sources away - Do not smoke.
 - Protect against electrostatic charges.
 - Keep respiratory protective device available.
 - Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
 - Fumes can combine with air to form an explosive mixture.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
 - Store in a cool location.
 - Do not expose cylinder to temperatures higher than 50°C (122 °F)
- **Information about storage in one common storage facility:**
 - Store away from oxidizing agents.
 - Store separately from cylinders containing oxygen or oxidants by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.
 - Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**
 - Keep cylinder valve tightly closed.
 - Store in cool, dry conditions in well sealed receptacles.
 - Protect from heat and direct sunlight.
 - Store cylinder in a well ventilated area.
 - Store in accordance with local fire code and/or building code or any pertaining regulations.

* 8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
 - Adequate local ventillation.
 - Safety showers and eyewash stations should be nearby.
- **Components with limit values that require monitoring at the workplace:**

7803-51-2 phosphine (23-100%)	
EL	Short-term value: 1 ppm
	Long-term value: 0.3 ppm
- **Additional information:** The lists that were valid during the creation were used as basis.

(Contd. on page 5)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 4)

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Store protective clothing separately.

Avoid contact with the eyes and skin.

Protective clothing should be kept free of oil and grease.

PPE should be inspected and maintained regularly to retain its effectiveness.

- **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

- **Protection of hands:**



Protective gloves.

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

- **Eye protection:** Safety glasses

9 Physical and chemical properties

- **General Information**

Form:	Gaseous.
Color:	Colorless
Odor:	Fish-like

- **Change in condition**

Melting point/Melting range: -133.8°C

Boiling point/Boiling range: -87°C

- **Flash point:** Not applicable.

- **Ignition temperature:** 100°C

- **Auto igniting:** Spontaneously flammable in air.

- **Danger of explosion:** In use, may form flammable/explosive vapour-air mixture.
Explodes with oxygen

- **Solubility in / Miscibility with**

Water at 20°C: 0.33 g/l

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

(Contd. on page 6)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 5)

- **Dangerous reactions**
May form explosive gas mixture with air.
May react with oxidizing agents.
Explosive with oxygen
- **Dangerous products of decomposition:** None if used according to specifications.

* 11 Toxicological information

- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

7803-51-2 phosphine

Inhalative	LC50/4hr	20 ppm (rat)
------------	----------	--------------

- **Primary irritant effect:**

- **on the skin:** Caustic effect on skin and mucous membranes.

- **on the eye:** Strong caustic effect.

- **Sensitization:** No sensitizing effects known.

- **Additional toxicological information:**

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological information

- **Ecotoxic effects:**

- **Remark:** Very toxic for fish

- **General notes:**

Do not allow product to reach ground water, water course or sewage system.

Must not reach bodies of water or drainage ditch undiluted or unneutralized.

Danger to drinking water if even small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Very toxic for aquatic organisms

* 13 Disposal considerations

- **Product:**

- **Recommendation:** Unused product should be returned to vendor.

- **Uncleaned packagings:**

- **Recommendation:**

Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

- **Recommended cleansing agent:** None applicable.

CDN

(Contd. on page 7)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 6)

* 14 Transport information

· TDG and DOT regulations:



- Hazard class: 2
- Identification number: UN2199
- Packing group: -
- Proper shipping name (technical name): PHOSPHINE
- Label: 2.3+2.1
- Packaging group: -

· Maritime transport IMDG:



- IMDG Class: 2.3
- UN Number: 2199
- Label: 2.3+2.1
- Packaging group: -
- EMS Number: F-D,S-U
- Marine pollutant: No
- Proper shipping name: PHOSPHINE

· Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 2199
- Label: 2.3+2.1
- Packaging group: -
- Proper shipping name: PHOSPHINE

· UN "Model Regulation": UN2199; PHOSPHINE; 2.3 (2.1); -

* 15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is listed.

· Section 313 (Specific toxic chemical listings):

Substance is listed.

(Contd. on page 8)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 7)

· **TSCA (Toxic Substances Control Act):**

Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

· **Chemicals known to cause developmental toxicity:**

Substance is not listed.

· **Carcinogenicity categories**

· **EPA (Environmental Protection Agency)**

7803-51-2 phosphine

· **NTP (National Toxicology Program)**

Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

· **Canadian substance listings:**

· **Canadian Domestic Substances List (DSL)**

Substance is listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

Substance is not listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

Substance is listed.

· **Product related hazard informations:**

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· **Hazard symbols:**

Very toxic
 Extremely flammable
 Dangerous for the environment

· **Risk phrases:**

Extremely flammable.
 Spontaneously flammable in air.
 Very toxic by inhalation.
 Causes burns.

(Contd. on page 9)

Material Safety Data Sheet

Printing date 10/22/2008

Version 2

Reviewed on 10/22/2008

Trade name: Phosphine

(Contd. of page 8)

Very toxic to aquatic organisms.

· **Safety phrases:**

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

After contact with skin, wash immediately with plenty of ... (to be specified by the manufacturer).

Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Avoid release to the environment. Refer to special instructions/safety data sheets.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

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).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· **Abbreviations and Acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

N/A: Not Applicable