

Danger



SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name : Phosphorus Oxychloride
SDS no : SDS/ALM/106
Chemical description : Phosphorus Oxychloride
CAS-No. : 10025-87-3
EC-No. : 233-046-7
EC Index-No. : 015-009-00-5

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Contact supplier for more information on uses.
Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE MALAYSIA SDN. BHD.
Lot PT 2317, No. 21, Jalan PTB 1, Kawasan Perindustrian Tangga Batu, Mukim Sungai Udang,
76400 Melaka - Malaysia.

1.4. Emergency telephone number

Emergency telephone number : +606-351 3512

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP] and Malaysia OSH (CLASS) Regulations 2013 [P.U.(A) 310/2013] & ICOP CHC

Health hazards:	Acute toxicity (oral), Category 2	H300
	Acute toxicity (dermal), Category 3	H311
	Acute toxicity (inhalation: vapour) Category 1	H330
	Skin corrosion/irritation, Category 1	H314
	Serious eye damage/eye irritation, Category 1	H318
	Specific target organ toxicity - Single exposure, Category 1 (central nervous system, respiratory)	H370
	Specific target organ toxicity - Repeated exposure, Category 1 (central nervous system, respiratory, kidney)	H372
Environmental hazards:	Hazardous to the aquatic environment - Acute Hazard, Category 3	H412

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP] and Malaysia OSH (CLASS) Regulations 2013 [P.U.(A) 310/2013] & ICOP CHC

Hazard pictograms (CLP & CLASS) :



Signal word (CLP & CLASS):
Hazard statements (CLP & CLASS):

Danger
H300 - Fatal if swallowed.
H311 - Toxic in contact with skin
H330 - Fatal if inhaled.
H314 - Causes severe skin burns and eye damage.
H318 - Causes serious eye damage.
H370 - Causes damage to organs. (central nervous system, respiratory)
H372 - Causes damage to organs through prolonged or repeated exposure.
(central nervous system, respiratory, kidney)
H412 - Harmful to aquatic life (acute).
EUH014 - Reacts violently with water.
EUH029 - Contact with water liberates toxic gas.

Precautionary statements (CLP & CLASS)

- Prevention: P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hand thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P271 - Use only outdoors or in a well-ventilated area.
P285 - [In case of inadequate ventilation] Wear respiratory protection.
P273 - Avoid release to the environment.
- First-aid measures: P308 + P313 - If exposed or concerned: Call a doctor.
P314 - Get medical advice/attention if you feel unwell.
P304 + P340 + P310 - IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing. Immediately call a doctor.
P302 + P361 + P353 + P352 + P312 - IF ON SKIN: Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash with plenty water and soap. Call a doctor if you feel unwell.
P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor.
P301 + P330 + P331 + P310 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Immediately call a doctor.
- Storage: P403 + P233 + P405 - Store in a well-ventilated place. Keep container tightly closed. Store locked up.
- Disposal: P501 - Dispose of contents / container in accordance with related laws and regional regulations.

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP] and Malaysia OSH (CLASS) Regulation 2013 [P.U.(A) 310/2013] & ICOP CHC
Phosphorus Oxychloride	(CAS-No.) 10025-87-3 (EC-No.) 233-046-7 (EC Index-No.) 015-009-00-5	100	Acute Tox. 2 (Oral), H300 Acute Tox. 3 (Dermal), H311 Acute Tox. 1 (Inhalation, vapour), H330 Skin Corr. 1, H314 Eye Dam. 1, H318 STOT SE 1, H370 STOT RE 1, H372 Aquatic Acute 3, H412

Contains no other components or impurities which will influence the classification of the product.

3.2. **Mixtures** : Not applicable

SECTION 4: First aid measures

4.1. **Description of first aid measures**

- Inhalation: Remove person to fresh air and keep comfortable for breathing.
Immediately call a doctor.
- Skin contact: Take off immediately all contaminated clothing.
Rinse skin with water or shower. Wash with plenty water and soap.
Call a doctor if you feel unwell.
Take off immediately all contaminated clothing and wash it before reuse.
- Eye contact: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a doctor.
- Ingestion: Rinse mouth. Do NOT induce vomiting.
Immediately call a doctor.

4.2. **Most important symptoms and effects, both acute and delayed**

When exposed it shows symptoms of corrosiveness in eyes, skin, respiratory tract, and it causes dizziness, headache, lassitude, bronchitis, nephritis, shock, collapse, edema of lungs, and sustained heart disorder.
Delayed symptoms: Edema of the lungs and the optic nerve disorder.

4.3. **Indication of any immediate medical attention and special treatment needed**

- Protection of first aiders: Rescuers should wear appropriate protective equipment (protective gloves(impermeable), gas mask, etc.) depending on the situation.
- Special precautions for doctors: Rest and medical follow-up are essential.
Consider using an appropriate spray immediately.

SECTION 5: Firefighting measures

5.1. **Extinguishing media**

- Suitable extinguishing media: Non-flammable. Use the appropriate fire extinguishing agents for the surrounding fire.
- Unsuitable extinguishing media: Water (but can be used only for absorbing and diluting hydrogen chloride generated).

5.2. **Special hazards arising from the substance or mixture**

- Specific hazards: Fire may cause generation of irritant, poisonous or corrosive gases and fumes. Reaction with water may generate a large amount of heat and increase fume density in air. If heated or mixed with water, the container may explode.

5.3. **Advice for firefighters**

- Specific methods: Do not put water in a container: violent reaction might occur. Move a container from the fire affected area if safe to do so. If impossible to move the container, spray water the container and the surrounding area to cool them down. After extinguishing the fire, cool the container with plenty of water.
- Special protective equipment for fire fighters: Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. **Personal precautions, protective equipment and emergency procedures**

The workers wear the suitable protective equipment (See Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION), avoid contacts with eye and skin and inhalation of gas.
If a fire has not started in a leakage, wear the protective clothes which is airtight and impervious.
Immediately, isolate reasonable distance in all directions from the leaked area.
Forbid unauthorized persons from entering the area. Stay upwind. Evacuate from low ground.

6.2. Environmental precautions

Avoid environmental impacts by discharging into rivers, etc.

6.3. Methods and material for containment and cleaning up

Stop leak if safe to do so. Don't touch the broken container or leaked substance without wearing appropriate protective clothes. Collect with clean and static electricity proven tools and put it into plastic container and then cover it loosely, and dispose. Do not put water into the container.

Recovery, Neutralization:

In the case of a small leakage, cover it with dry soil, sand or other non-flammable materials and prevent scattering and the rain by covering with a plastic sheet. In the case of a large leakage, prevent outflow by mounds of soil and collect it in the sealable containers as much as possible. Afterward, gradually process it with aqueous solution such as calcium hydroxide or soda ash (slowly) and wash it away with water.

Prevention of secondary disasters:

Remove steam by water mist.

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product:

- Technological countermeasure:

Implement facilities measure which is mentioned in "Section 8 Exposure controls / Personal protection" and wear protective equipment.

- Local / whole ventilation:

Implement the local or whole ventilation which is mentioned in "Section 8 Exposure controls / Personal protection".

Safe handling of the gas receptacle:

- Precautions for safe handling:

Use only outdoors or in well-ventilated area.

Prevent leakage of liquid and emission of steam in every way.

DO NOT contact, inhale or ingest. Wash hands thoroughly after handling.

DO NOT breathe mist/vapours/spray. Do NOT get in eyes.

- Contact avoidance:

Refer to "Section 10 Stability and reactivity"

7.2. Conditions for safe storage, including any incompatibilities

Incompatibilities:

Refer to "Section 10 Stability and reactivity".

Conditions for safe storage:

Seal a container and store it in a well-ventilated and a cool dry place.

Store in a locked place.

Container and packaging materials:

Use containers specified by UN transport regulations.

Be careful of the materials when handling, since water will be more corrosive to metals.

Rubber - lined steel containers, glass and ceramic are durable.

7.3. Specific end use(s)

None

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Phosphorus Oxychloride (10025-87-3)		
OEL : Occupational Exposure Limits		
PEL : Permissible Exposure Limits		
Malaysia	USECHH 2000 (PEL) TLV-TWA	0.1 ppm or 0.63 mg/ m ³
ACGIH	ACGIH TWA (ppm)	0.1 ppm
	Remark (ACGIH)	URT irr
	Regulatory reference	ACGIH 2017

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- Equipment measures:
 - Ventilate for exhaust in order to maintain the concentrations in air underexposure limit. When fumes and mists were generated in a high temperature process, install a ventilating device to keep air pollutants less than controlled concentration.
 - Do not operate equipment and machineries in airtight place without using the local exhaust.
 - In order to keep the concentration in air within the recommended controls concentration, use the airtight process, the local exhaust, and other facilities to implement this.
 - Install a face washer and safety shower in the workplace where this material is stored or handled.

8.2.2. Individual protection measures, e.g. personal protective equipment

- A risk assessment should be conducted and documented in each work area to assess the exposure related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
 - PPE compliant to the recommended EN/ISO standards should be selected.
- Eye/face protection:
 - Wear goggles and a face shield when transfilling or breaking transfer connections.
 - Provide readily accessible eye wash stations and safety showers.
 - Standard EN 166 - Personal eye-protection - specifications.
- Skin protection:
 - Hand protection:
 - Wear chemical-resistant and impermeable protective gloves (Teflon, etc.)
 - Nitrile rubber and PVC are not suitable protective materials.
 - Neoprene is recommended.
 - Standard EN 374 - Protective gloves against chemicals.
 - Standard EN 388 - Protective gloves against mechanical risk.
 - Other:
 - Wear chemical protective clothing (such as acid-resistant suits) when there is a possibility of splashing.
 - Standard EN 943-1 - Full protective suits against liquid, solid and gaseous chemicals.
- Respiratory protection:
 - Wear proper respiratory protection.
 - If there is a chance of exposure, wear a supply of air mask, air respirator, or oxygen respirator.
 - Gas filters do not protect against oxygen deficiency.
 - Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks. Keep self contained breathing apparatus readily available for emergency use.
 - Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
- Thermal hazards:
 - None in addition to the above sections.

8.2.3. Environmental exposure controls

No additional information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state at 20°C / 101.3kPa	: Liquid
- Colour	: Colourless / clear liquid
- Odour	: Pungent and moldy odor
Odour threshold	: Not available
pH	: 1 (5g/L, 20°C) : IUCLID (2000)
Melting point / Freezing point	: 1.25°C : GESTIS (2014), HSDB (2014)
Boiling point	: 105.8°C : HSDB(2014) & GESTIS (2014)
Flash point	: Not Flammable : ICSC(1997)
Evaporation rate	: Not applicable.
Flammability (solid, gas)	: Not Flammable : ICSC(1997)

Explosive limits	: Not Flammable : ICSC(1997)
Vapour pressure	: 3.73 kPa (20°C), 5.3 kPa (27.3°C), 13.3 kPa (47.4°C), 100 mmHg (47.4°C) [Conversion value 13329Pa (47.4°C)] : Lange (16th, 2005)
Vapour density	: Not applicable.
Relative density, liquid (water = 1)	: No data.
Relative density, gas (air = 1)	: Lighter or similar to air.
Water solubility	: Water : reacts violently. React violently with alcohol, phenol, amine, and many other substances.
Partition coefficient n-octanol/water (Log Kow)	: No data.
Auto-ignition temperature	: Not Flammable : ICSC(1997)
Decomposition temperature	: No data.
Viscosity, kinematic	: No data.
Explosive properties	: Not Flammable : ICSC(1997)
Oxidising properties	: Not applicable.

9.2 Other information

Molar mass	: 153.33 g/mol
Critical temperature [°C]	: 331.8 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal handling conditions.
Upon heating it, it releases mists such as hydrogen chloride and phosphorus oxide in decomposition.

10.2. Chemical stability

Stable under normal handling conditions.
Upon heating it, it releases mists such as hydrogen chloride and phosphorus oxide in decomposition.

10.3. Possibility of hazardous reactions

Reacts violently with water, alcohol, phenol, amine and many other substances.

10.4. Conditions to avoid

Avoid heating, contacts with combustible materials, incompatible materials.

10.5. Incompatible materials

Water, alcohol, phenol, amine and metal (excluding nickel). For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Forms phosphoric acid and hydrogen chloride by hydrolysis.
Heat decomposition generates mists of phosphorous chlorides and oxides.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity (oral):

There are two data reports (SIDS (2006)) with LD50 values of 36 mg / kg and 380 mg / kg in rats. Although it corresponds to Category 2 and Category 4, respectively, it was set as Category 2 where the minimum value of LD50 value corresponds. A new high-priority information source (SIDS (2006)) was added and the classification was reviewed.

Acute toxicity (dermal):

There are reports of LD50 values in rabbits (1,000 mg / kg <LD50 <1,580 mg / kg (male)) and 631 mg / kg <LD50 <1,000 mg / kg (female) (SIDS (2006)). Although it corresponds to Category 3 and Category 4, respectively, it was set as Category 3 where the minimum value of LD50 value corresponds. A new information source (SIDS (2006)) was added and the classification was reviewed.

Acute toxicity (Inhalation: gas):

A liquid in the GHS definition.

Acute toxicity (Inhalation: vapor):

Based on the rat LC50 value (4 hours) reported as 48.4 ppm (SIDS (2006), ACGIH (7th, 2001)), it was classified into Category 1. Since the LC50 value is lower than 90% of the saturated vapor pressure concentration (52,320 ppm), the standard value in ppm was applied assuming that it does not contain mist.

Acute toxicity (Inhalation: dust, mist):

Classification not possible due to lack of data.

Skin corrosion/irritation:

In the skin irritation test using rabbits, several results indicating that it is corrosive were obtained (SIDS (2006)). There is also a description that it exhibits strong irritation in humans (ACGIH (7th, 2001)). From the above results, it was classified into Category 1. This substance is classified as "C;R35" in the EU DSD classification and "Skin Corr. 1B H314" in the EU CLP classification.

Serious eye damage/irritation:	There have been several reports that severe damage was observed in eye irritation tests using rabbits (SIDS (2006)). In addition, this substance is classified as Category 1 for skin corrosion / irritation. From the above results, it was classified into Category 1.
Respiratory or skin sensitisation:	Classification not possible due to lack of data. In addition, although there is a report that sensitization was not seen in the maximization test using guinea pigs and the ear swelling test using mice, the details of the test conditions etc. are unknown, so it is not sufficient for use in classification. It was judged that the data was correct.
Germ cell mutagenicity:	Classification not possible due to lack of data. There are no in vivo data, and in vitro negative bacterial reverse mutation test (SIDS (2006)).
Carcinogenicity:	Classification not possible due to lack of data.
Toxic for reproduction: Fertility	Classification not possible due to lack of data.
Toxic for reproduction: Unborn child	Classification not possible due to lack of data.
STOT-single exposure:	The substance is severely irritating to the respiratory tract (SIDS (2006),ACGIH (7th, 2001)). In humans, by inhalation exposure, headache, dizziness,nausea, vomiting, chest pain, cough, wheezing, dyspnea, bronchitis, bronchial pneumonia, pulmonary edema, oral exposure, stomach pain, vomiting,esophageal / gastric perforation, Weakness has been reported (SIDS (2006),PATTY (6th, 2012), ACGIH (7th, 2001), HSDB (Access on September 2014)).In laboratory animals, inhalation exposure to rats has been reported to include fluency, lateral position, ataxia, forced breathing, convulsions,respiratory impairment, and orally administered rats, ataxia, weakness, and decreased respiratory rate (SIDS (2006)).Inhalation effects in rats were observed in the dose range corresponding toCategory 1, and oral effects in rats were observed in the dose range corresponding to Category 2.Based on the above, it was classified into Category 1 (central nervous system, respiratory organs).The rat neuronal degeneration described in the old classification was not adopted because it was described as a repeated dose test.
STOT-repeated exposure:	In humans, chronic inhalation effects due to occupational exposure include respiratory (cough, rhinitis, bronchitis, pneumonia, pulmonary edema, etc.), central nervous system (headache, dizziness, sleep disorders, weakness, nausea, etc.) In addition to (2006), ACGIH (7th, 2001)), there is a description that cases of nephritis were observed (ACGIH (7th, 2001), PATTY (6th, 2012)). In laboratory animals, the substance (estimated as vapor) was inhaled to rats for 4 months, resulting in a respiratory concentration of 0.48-1.34 mg / m3 (conversion to guidance value: 0.00032-0.00089 mg / L / 6 hours)). In addition to irritating effects on the system (rhinitis, bronchitis), effects on the kidneys (weight increase, steatosis) were described (SIDS (2006)). Nervous system, respiratory system, kidney).
Aspiration hazard:	Classification not possible due to lack of data.

SECTION 12: Ecological information

12.1. Toxicity

EC50 48h - Daphnia magna [mg/l]	: > 100 mg/L (SIDS, 2006)
EC50 72h - Algae [mg/l]	: Chronic toxicity date, NOEC = 12.5 mg/L : 32.12 mg/L, Category 3 (SIDS, 2006)
LC50 96 h - fish [mg/l]	: No data available.
Hazardous to the ozone layer	: The substance is not listed in the Montreal Protocol Annex.

12.2. Persistence and degradability

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

Effect on the ozone layer : No data available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

: Dispose in accordance with local/regional/national/international regulations.

13.2. Additional information

: Dispose in accordance with local/regional/national/international regulations.

SECTION 14: Transport information

14.1. UN number

UN-No. : 1810

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : PHOSPHORUS OXYCHLORIDE

Transport by sea (IMDG) : PHOSPHORUS OXYCHLORIDE

14.3. Transport hazard class(es)

Labelling



6.1 : Toxic substances.

8 : Corrosive substances.

Transport by road/rail (ADR/RID)

Class : 6.1

Classification code : TC3

Hazard identification number : X668

Tunnel Restriction : C/D - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage :
Passage forbidden through tunnels of category D and E.

Transport by sea (IMDG)

Class / Div. (Sub, risk(s)) : 6.1 (8)

Emergency Schedule (EmS) - Fire : F-A

Emergency Schedule (EmS) - Spillage : S-B

14.4. Packing group

Transport by road/rail (ADR/RID) : 1 - substances presenting high danger.

Transport by air (ICAO-TI / IATA-DGR) : Not applicable.

Transport by sea (IMDG) : 1 - substances presenting high danger.

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P602

Transport by air (ICAO-TI / IATA-DGR) : P602

Transport by sea (IMDG) : P602

Special transport precautions : When transporting, avoid direct sunlight. Confirm no leakage to containers.
Load to prevent falling dropping off or damage containers and take preventive measures of collapse.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

: Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU-Regulations**

Restrictions on use : None.
Seveso Directive : 2012/18/EU (Seveso III) : Not covered.

National regulations

: Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

: Ensure all national/local regulations are observed.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2015/830 and Malaysia Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013 [P.U.(A) 310/2013] & Industrial Code of Practice on Chemical Classification and Hazard Communication 2014 and its Amendment 2019.

Abbreviations and acronyms

: ATE - Acute Toxicity Estimate
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
EINECS - European Inventory of Existing Commercial Chemical Substances
CAS# - Chemical Abstract Service number
PPE - Personal Protection Equipment
LC50 - Lethal Concentration to 50 % of a test population
RMM - Risk Management Measures
PBT - Persistent, Bioaccumulative and Toxic
vPvB - Very Persistent and Very Bioaccumulative
STOT- SE : Specific Target Organ Toxicity - Single Exposure
CSA - Chemical Safety Assessment
EN - European Standard
UN - United Nations
ADR - European Agreement concerning the International Carriage of Dangerous Goods on road
IATA - International Air Transport Association
IMDG code - International Maritime Dangerous Goods
RID - Regulations concerning the International Carriage of Dangerous Goods by rail .
WGK - Water Hazard Class
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure

Training advice

: Users of breathing apparatus must be trained.
Ensure operators understand the toxicity hazard.

DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury and damage resulting from its use can be accepted.

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