SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.0
Creation Date: July 15, 2019
Revision Date: July 15, 2019

SECTION 1: Identification

1.1 GHS Product identifier

Product name Phosphorus pentachloride

1.2 Other means of identification

Product number -
Other names Phosphorus pentachloride;Phosphorus(V) Chloride;pentachloro-λ^5-phosphane

1.3 Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research use.
Uses advised against no data available

1.4 Supplier's details

Company Shanghai Yien Chemical Technology Co., Ltd
Address Building 6, 28 Yingong Road, Fengxian District, Shanghai Chemical Industry Zone, Shanghai, 201400, China
Telephone +86-400-133-2688

1.5 Emergency phone number

Emergency phone number +86-400-133-2688
Service hours Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Acute toxicity - Category 4, Oral
Skin corrosion, Sub-category 1B
Acute toxicity - Category 2, Inhalation
Specific target organ toxicity – repeated exposure, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger
Hazard statement(s) H302 Harmful if swallowed
H314 Causes severe skin burns and eye damage

H330 Fatal if inhaled
H373 May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.

Response

P301+P317 IF SWALLOWED: Get medical help.
P330 Rinse mouth.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P320 Specific treatment is urgent (see ... on this label).
P319 Get medical help if you feel unwell.

Storage

P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Phosphorus pentachloride	Phosphorus pentachloride	10026-13-8	233-060-3	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

It can cause death due to pulmonary edemaor by circulatory shock. (EPA, 1998)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Treatment for exposure to the chloro cmpds consists of removal from the source, removal of any clothing contaminated with the cmpds, and observation and treatment of any respiratory complication such as bronchospasm and pulmonary edema that may arise. Ocular splash or injury requires copious irrigation and examination with slit lamp to assess degree of injury, and ophthalmologic consultation if indicated. Unspecified phosphorus cmpds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

If material involved in fire: Use dry chemical, dry sand, or carbon dioxide. Do not use water on material itself. If large quantities of combustibles are involved, use water in flooding quantities as spray and fog. Use water spray to knock-down vapors. Phosphorus pentachloride, solid

5.2 Specific hazards arising from the chemical

When heated to decomposition, it emits highly toxic fumes of chlorides and chlorine. Will react with water or steam to produce heat and toxic and corrosive fumes. Reacts violently with moisture, chlorine trioxide, fluorine hydroxylamine, magnesium oxides, diphosphorus trioxide, sodium and potassium. Decomposed by water to form hydrogen chloride, phosphoric acids, corrosive materials, and heat. This heat may be sufficient to ignite surrounding combustible materials. Incompatible with water, magnesium oxide, chemically active metals: sodium, potassium; alkalis; aluminum; chlorine dioxide; chlorine; diphosphorus trioxide; fluorine; hydroxylamine; magnesium oxide; 3'-methyl-2-nitrobenzanilide; nitrobenzene; sodium; urea; water. (EPA, 1998)

5.3 Special protective actions for fire-fighters

NO water. In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water. NO direct contact with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT wash away into sewer. Sweep spilled substance into covered sealable containers. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT wash away into sewer. Sweep spilled substance into covered sealable containers. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

1. ventilate area of spill. 2. collect spilled material in most convenient & safe manner & deposit in sealed containers for reclamation or for disposal in secured sanitary landfill, or 3. cover with sodium bicarbonate or equal mixt of soda ash & slaked lime.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO contact with water. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Dry. Well closed.Store in a glass bottle with a ground glass stopper and keep the bottle tightly closed. Protect against physical damage.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.1 ppm as TWA.MAK: (inhalable fraction): 1 mg/m3; peak limitation category: I(1); pregnancy risk group: C.EU-OEL: 1 mg/m3 as TWA

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Phosphorus pentachloride is a greenish-yellow crystalline solid with an irritating odor. It is decomposed by water to form hydrochloric and phosphoric acid and heat. This heat may be sufficient to ignite surrounding combustible material. It is corrosive to metals and tissue. Long term exposure to low concentrations or short term exposure to high concentrations can result in adverse health effects from inhalation.
Colour	White to pale yellow crystalline mass
Odour	Pungent, unpleasant odor
Melting point/freezing point	179-181°C (subl.)
Boiling point or initial boiling point and boiling range	160°C
Flammability	Noncombustible Solid
Lower and upper explosion limit/flammability limit	no data available
Flash point	none
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available

Kinematic viscosity	no data available
Solubility	Reacts with water (NIOSH, 2016)
Partition coefficient n-octanol/water	no data available
Vapour pressure	1 mm Hg at 131.9° F (EPA, 1998)
Density and/or relative density	1.6
Relative vapour density	7.2 (Air = 1)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Decomposes on heating. This produces toxic and corrosive fumes including hydrogen chloride and phosphorus oxides. Reacts violently with water and moisture. This produces phosphoric acid and hydrogen chloride. Reacts with many compounds. This generates fire and explosion hazard. Attacks many metals. This produces flammable/explosive gas (hydrogen - see ICSC 0001). Attacks plastics and rubber.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

MODERATE, BY CHEMICAL REACTION. REACTS VIOLENTLY WITH MOISTURE.The vapour is heavier than air.PHOSPHORUS PENTACHLORIDE is a lightly yellow, fuming crystalline material, highly caustic, corrosive and toxic. Flammable by chemical reaction. Violent exothermic reaction with water or steam. When heated to decomposition it emits highly toxic fumes of chlorides and oxides of phosphorus. Explosive reaction with alkaline metals (sodium, potassium), urea. Ignites on contact with fluorine. Violent reaction with aluminum, chlorine trioxide, hydroxylamine, magnesium oxide, nitrobenzene, phosphorus(III) oxide, potassium. Carbamates form explosive products [Bretherick, 5th ed., 1995, p. 1360]. Reaction with the mixture of chlorine and chlorine dioxide causes explosion [Mellor, 1941, vol. 2, p. 281; 1940, vol. 8, p. 1013].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Hydrolyzed by water to form phosphoric acid & hydrogen chloride.

10.6 Hazardous decomposition products

Produces phosphorus trichloride & chlorine when heated; produces phosphorus oxychloride, phosphoric acid, & hydrochloric acid when decomposed in water

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: no data available
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation may cause lung oedema. See Notes. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

Repeated or prolonged contact with skin may cause dermatitis.

Aspiration hazard

A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: no data available
- Toxicity to daphnia and other aquatic invertebrates: no data available
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

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 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN1806 (For reference only, please check.)	IMDG: UN1806 (For reference only, please check.)	IATA: UN1806 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: PHOSPHORUS PENTACHLORIDE (For reference only, please check.)	IMDG: PHOSPHORUS PENTACHLORIDE (For reference only, please check.)	IATA: PHOSPHORUS PENTACHLORIDE (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 8 (For reference only, please check.)	IMDG: 8 (For reference only, please check.)	IATA: 8 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: II (For reference only, please check.)	IMDG: II (For reference only, please check.)	IATA: II (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: No IMDG: No IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Phosphorus pentachloride	Phosphorus pentachloride	10026-13-8	233-060-3
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date	July 15, 2019
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Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%
- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home
- HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple
- ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg
- Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp
- ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

Reacts violently with fire extinguishing agents such as water.The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort.Rest and medical observation are therefore essential.Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.

Any questions regarding this SDS, Please send your inquiry to sds@xixisys.com

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