ChemicalBook

Chemical Safety Data Sheet MSDS / SDS

Phosphorus trichloride

Revision Date:2025-02-01 Revision Number:1

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

Product identifier

Product name	: Phosphorus trichloride
CBnumber	: CB6459046
CAS	: 7719-12-2
EINECS Number	: 231-749-3
Synonyms	: pcl3,phosphorus trichloride

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

Relevant identified uses	: For R&D use only. Not for medicinal, household or other use.
Uses advised against	: none

Company Identification

Company	: Chemicalbook
Address	: Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone	: 010-86108875

SECTION 2: Hazards identification

Classification of the substance or mixture

Acute toxicity - Category 2, Oral

Skin corrosion, Sub-category 1A

Acute toxicity - Category 2, Inhalation

Specific target organ toxicity – repeated exposure, Category 2

Label elements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H300 Fatal if swallowed

H301 Toxic if swalloed

H314 Causes severe skin burns and eye damage

H318 Causes serious eye damage

H330 Fatal if inhaled

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs through prolonged or repeated exposure

Precautionary statement(s)

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 Wear respiratory protection.

P310 Immediately call a POISON CENTER or doctor/physician.

P320 Specific treatment is urgent (see … on this label).

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower.

P304+P340 IF INHALED: Remove victim to fresh air and Keep at rest in a position comfortable for breathing.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continuerinsing.

P405 Store locked up.

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

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+P316 IF SWALLOWED: Get emergency medical help immediately.

P321 Specific treatment (see ... on this label).

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.

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.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Phosphorus trichloride
Synonyms	: pcl3,phosphorus trichloride
CAS	: 7719-12-2
EC number	: 231-749-3
MF	: Cl3P
MW	: 137.33

SECTION 4: First aid measures

Description of 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. Refer for medical attention .

Most important symptoms and effects, both acute and delayed

This material is highly toxic; it may cause death or permanent injury. Contact is highly irritating to the skin, eyes, and mucous membranes, and the material is an irritant through oral and inhalation exposure. (EPA, 1998)

Indication of any immediate medical attention and special treatment needed

Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary . Monitor for shock and treat if necessary . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with 0.9% saline (NS) during transport . Do not use emetics. For ingestion, rinse mouth and administer 5 ml/kg up to 200 ml of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool . Cover skin burns with dry sterile dressings after decontamination . Chlorine and related compounds

SECTION 5: Firefighting measures

Extinguishing media

Evacuation: If fire becomes uncontrollable or container is exposed to direct flame - consider evacuation of one-third (1/3) mile radius.

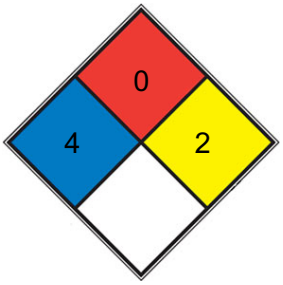
Specific Hazards Arising from the Chemical

This material will react violently with water, producing heat and toxic and corrosive fumes. When heated to decomposition, it emits highly toxic fumes of chlorides and phosphorus oxides. It may ignite other combustible materials. Reacts violently with water. Reacts explosively with acetic acid, aluminum, chromyl chloride, diallylphosphite and allyl alcohol, dimethyl sulfoxide, fluorine, hydroxylamine, iodine monochloride, lead dioxide, nitric acid, nitrous acid, organic matter, potassium, and sodium. Avoid contact with water, steam, or acids. Hazardous polymerization may not occur. (EPA, 1998)

Advice for firefighters

NO hydrous agents. 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.

NFPA 704



HEALTH	4	Very short exposure could cause death or major residual injury (e.g. hydrogen cyanide, phosgene, methyl isocyanate, hydrofluoric acid)
FIRE	0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 820 °C (1,500 °F) for a period of 5 minutes.(e.g. Carbon tetrachloride)
REACT	2	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water (e.g. white phosphorus, potassium, sodium)
SPEC. HAZ.		

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in dry sand or inert absorbent. Then store and dispose of according to local regulations. Personal protection: chemical protection suit including self-contained breathing apparatus.

Environmental precautions

Evacuate danger area! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in dry sand or inert absorbent. Then store and dispose of according to local regulations. Personal protection: chemical protection suit including self-contained breathing apparatus.

Methods and materials for containment and cleaning up

Environmental considerations: water spill: Neutralize with agricultural lime (CaO), crushed limestone ($CaCO_3$), or sodium bicarbonate ($NaCO_3$). Use mechanical dredges or lifts to remove immobilized masses of pollutant and precipitates. Adjust pH to neutral (pH=7).

SECTION 7: Handling and storage

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.

Conditions for safe storage, including any incompatibilities

Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. See Chemical Dangers. Dry. Well closed. Ventilation along the floor.Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. See Chemical Dangers. Dry. Well closed. Ventilation along the floor.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.2 ppm as TWA; 0.5 ppm as STEL.MAK: 0.57 mg/m3, 0.1 ppm; peak limitation category: I(1); pregnancy risk group: C

Biological limit values

no data available

Exposure controls

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

Individual protection measures

Eye/face protection

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

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	Liquid
Colour	Yellow

Odour	Pungent
Melting point/freezing point	-112°C
Boiling point or initial boiling point and boiling range	76°C
Flammability	Noncombustible Liquid; however, a strong oxidizer that may ignite combustibles upon contact.
Lower and upper explosion limit/flammability limit	no data available
Flash point	none
Auto-ignition temperature	Not flammable (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.65 cP at 0 deg C; 0.438 cP at 50 deg C
Solubility	Soluble in benzene, carbon sulfide, ether, chloroform, carbon tetrachloride.
Partition coefficient n-octanol/water	no data available
Vapour pressure	23.32 psi (55 °C)
Density and/or relative density	approximate 1.6
Relative vapour density	approximate 1.6
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes on heating. This produces toxic and corrosive fumes including hydrogen chloride and phosphorus oxides. Reacts with oxidants. Reacts violently with water. This produces heat and decomposition products including hydrochloric acid and phosphoric acid. This generates fire and explosion hazard. Reacts violently with alcohols, phenols and bases. Attacks metals and many other materials.

Chemical stability

no data available

Possibility of hazardous reactions

Reacts with water to form hydrochloric acid, which reacts with most metals to form flammable hydrogen gas.The vapour is heavier than air.PHOSPHORUS TRICHLORIDE is a strong reducing agent that may ignite combustible organic materials upon contact. May generate flammable and potentially explosive gaseous hydrogen upon contact with many common metals (except nickel and lead). Reactions with water are violent and produce heat and flashes of fire. Gives intensely exothermic reactions with iodine monochloride [Mellor 2, Supp. 1:502. 1956]. Several laboratory explosions have been reported arising from mixtures with acetic acid, along with other acids, sulfuric acid and derivatives, carboxylic acids, etc. These have been ascribed to poor heat control allowing the formation of phosphine [J. Am. Chem. Soc. 60:488. 1938]. Ignites when mixed with hydroxylamine [Mellor 8:290. 1946-47]. Causes an explosion on contact with nitric acid [Comp. Rend. 28:86]. It is incompatible with many common oxidants such as: sodium peroxide, fluorine, chromyl chloride, iodine chloride, to name a few. Isopropanol can react with PCl3, forming toxic HCl gas. (Logsdon, John E., Richard A. Loke., Isopropyl Alcohol. Kirk-Othmer Encyclopedia of Chemical Technology. John Wiley & Sons, Inc. 1996.)

Conditions to avoid

no data available

Incompatible materials

Reacts with water to form hydrochloric acid, which reacts with most metals to form flammable hydrogen gas.

Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /hydrogen chloride and phosphorus oxide/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 550 mg/kg
- Inhalation: LC50 Rat inhalation 104 ppm/4 hr
- 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. Inhalation of the vapour may cause lung oedema. See Notes. Exposure above the OEL could cause death. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

no data available

Aspiration hazard

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

SECTION 12: Ecological information

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

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Other adverse effects

no data available

SECTION 13: Disposal considerations

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

UN Number

ADR/RID: UN1809 (For reference only, please check.)

IMDG: UN1809 (For reference only, please check.)

IATA: UN1809 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: PHOSPHORUS TRICHLORIDE (For reference only, please check.)

IMDG: PHOSPHORUS TRICHLORIDE (For reference only, please check.)

IATA: PHOSPHORUS TRICHLORIDE (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)

IMDG: 6.1 (For reference only, please check.)

IATA: 6.1 (For reference only, please check.)

Packing group, if applicable

ADR/RID: I (For reference only, please check.)

IMDG: I (For reference only, please check.)

IATA: I (For reference only, please check.)

Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

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.

PICCS

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

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 is therefore essential.Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.