

Classified as hazardous in accordance with the criteria of EPA New Zealand

Section 1 - Identification

Product Identifier

Product Name	<u>Thiophosphoryl chloride</u>
CAS No	3982-91-0
Synonyms	Phosphorus sulfochloride
Molecular Formula	Cl ₃ S P
Molecular Weight	169.39
Recommended Use	Laboratory chemicals.
Uses advised against	No Information available

Product Code	208350000; 208351000; 208352500
Address	Thermo Fisher Scientific New Zealand Ltd 244 Bush Road, Albany, Auckland, New Zealand
Emergency Tel.	CHEMTREC® 09 980 6780 or +64 9 980 6780
Telephone / Fax Numbers	Tel: 09 980 6700 Fax: 09 980 6788
E-mail address	<u>ANZinfo@thermofisher.com</u>

Section 2 - Hazard(s) Identification

Classification under Work Safe New Zealand

Classified as hazardous in accordance with the criteria of EPA New Zealand

GHS Classification

Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Acute Oral Toxicity	Category 2
Acute Inhalation Toxicity - Vapors	Category 1
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity - (single exposure)	Category 3

Environmental hazards

Based on available data, the classification criteria are not met

Label Elements**Signal Word****Danger****Hazard Statements**

H314 - Causes severe skin burns and eye damage

H335 - May cause respiratory irritation

H300 + H330 - Fatal if swallowed or if inhaled

Precautionary Statements**Prevention**

P264 - Wash face, hands and any exposed skin thoroughly after handling

P270 - Do not eat, drink or smoke when using this product

P271 - Use only outdoors or in a well-ventilated area

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

P284 - Wear respiratory protection

Response

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

P304 + P340 - IF INHALED: Remove person to fresh air and keep 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. Continue rinsing

P310 - Immediately call a POISON CENTER or doctor

P330 - Rinse mouth

P331 - Do NOT induce vomiting

P363 - Wash contaminated clothing before reuse

Storage

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

P405 - Store locked up

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Other hazards which do not result in classification

Lachrymator (substance which increases the flow of tears) This product does not contain any known or suspected endocrine disruptors

Reacts violently with water

Contact with water liberates toxic gas

Section 3 - Composition and Information on Ingredients

Component	CAS No	Weight %
Phosphorus trichloride	7719-12-2	1-3
Phosphorus oxychloride	10025-87-3	0.1-1
Thiophosphoryl chloride	3982-91-0	>95

Section 4 - First Aid Measures

Description of first aid measures**General Advice**

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

New Zealand Emergency Tel.	CHEMTREC® 09 980 6780 or +64 9 980 6780
Inhalation	If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh air. Immediate medical attention is required.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Self-Protection of the First Aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.
First Aid Facilities	Eyewash, safety shower and washroom.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed
Notes to Physician	Treat symptomatically.

Section 5 - Fire Fighting Measures

Suitable Extinguishing Media

Dry chemical. Carbon dioxide (CO₂). CO₂, dry chemical, dry sand, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons

Foam. Contact with water liberates toxic gas. Water.

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Contact with water liberates toxic gas. Reacts violently with water.

Hazardous Combustion Products

Sulfur oxides, Oxides of phosphorus, Sulfides, Hydrogen chloride gas.

Decomposition Temperature

125 °C

Special protective equipment and precautions for fire fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

Section 6 - Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions

Should not be released into the environment. See Section 12 for additional Ecological Information. Do not flush into surface water

or sanitary sewer system.

Methods for Containment and Clean Up

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Do not expose spill to water.

Precautions to prevent secondary hazards

Clean contaminated objects and areas thoroughly observing environmental regulations

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

Section 7 - Handling and Storage

Precautions for Safe Handling**Advice on safe handling**

Do not get in eyes, on skin, or on clothing. Wear personal protective equipment/face protection. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Do not allow contact with water. Handle under an inert atmosphere.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

Conditions for Safe Storage, Including any Incompatibilities**Storage Conditions**

Protect from moisture. Corrosives area. Keep under nitrogen. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from water or moist air. Store under an inert atmosphere.

Incompatible Materials

Strong oxidizing agents. Alcohols. Metals. Bases. Amines.

AS/NZS 2243.10:2004, Safety in laboratories - Storage of chemicals

Section 8 - Exposure Controls and Personal Protection

Control parameters**Exposure limits**

NZ - Workplace Exposure Standards and Biological Exposure Indices (6th edition). New Zealand Department of Labor

UK - EH40/2005 Work Exposure Limits, Fourth edition. Published 2020.

ACGIH - Threshold Limit Values - Ceiling (TLV-C) guidelines by the American Conference of Governmental Industrial Hygienists (ACGIH) for controlling worker exposure to airborne chemical concentrations in the workplace.

AUS - Exposure Standards for Atmospheric Contaminants in the Occupational Environment - Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:3008(1995)]

Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)] updated in August, 2005. Safe Work Australia

Component	New Zealand WEL	Australia	ACGIH TLV	The United Kingdom
Phosphorus trichloride	TWA: 0.2 ppm TWA: 1.1 mg/m ³ STEL: 0.5 ppm STEL: 2.8 mg/m ³	STEL: 0.5 ppm STEL: 2.8 mg/m ³ TWA: 0.2 ppm TWA: 1.1 mg/m ³	TWA: 0.2 ppm STEL: 0.5 ppm	STEL: 0.5 ppm 15 min STEL: 2.9 mg/m ³ 15 min TWA: 0.2 ppm 8 hr TWA: 1.1 mg/m ³ 8 hr
Phosphorus oxychloride	TWA: 0.1 ppm TWA: 0.63 mg/m ³	TWA: 0.1 ppm TWA: 0.63 mg/m ³	TWA: 0.1 ppm	STEL: 0.6 ppm 15 min STEL: 3.8 mg/m ³ 15 min TWA: 0.2 ppm 8 hr TWA: 1.3 mg/m ³ 8 hr

Biological limit values

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific

regulatory bodies

Appropriate engineering controls**Engineering Measures**

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use only under a chemical fume hood. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Individual protection measures, such as personal protective equipment

Eye Protection Goggles Face protection shield (Australian/New Zealand Standard AS/NZS 1337 - Eye protectors for Industrial applications)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	AUS/NZ Standard	Glove comments
Nitrile rubber, Neoprene, Natural rubber, PVC.	See manufacturers recommendations	-	AS/NZS 2161	(minimum requirement)

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Skin and body protection Long sleeved clothing

Respiratory Protection Use an AS/NZS 1716 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained in line with AS/NZS 1715 on the use and maintenance of respiratory protective devices

Recommended Filter type: Organic gases and vapours filter Type A Brown conforming to EN14387 (or AUS/NZ equivalent)

Recommended half mask:- Valve filtering: EN405 or Half mask: EN140 plus filter, EN 141 (or AUS/NZ equivalent) When RPE is used a face piece Fit Test should be conducted

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Prevent product from entering drains.

Section 9 - Physical and Chemical Properties**Information on basic physical and chemical properties**

Physical State	Liquid	
Appearance	Light yellow	
Odor	pungent	
Odor Threshold	No data available	
pH	No information available	
Melting Point/Range	-35 °C / -31 °F	
Softening Point	No data available	
Boiling Point/Range	125 °C / 257 °F	@ 760 mmHg
Flammability (liquid)	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Flash Point	No information available	Method - No information available
Autoignition Temperature	340 °C / 644 °F	

Decomposition Temperature	125 °C	
Viscosity	No data available	
Water Solubility	Reacts with water	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	16 hPa @ 20 °C	
Density / Specific Gravity	1.668	
Bulk Density	Not applicable	Liquid
Vapor Density	5.8	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

Other information

Molecular Formula	Cl ₃ S P
Molecular Weight	169.39

Section 10 - Stability and Reactivity

Reactivity	Yes
Stability	Reacts violently with water. Contact with water liberates toxic gas.
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing. Reacts violently with water.
Conditions to Avoid	Excess heat, Incompatible products, Exposure to moist air or water, Exposure to moisture.
Incompatible Materials	Strong oxidizing agents, Alcohols, Metals, Bases, Amines.
Hazardous Decomposition Products	Sulfur oxides. Oxides of phosphorus. Sulfides. Hydrogen chloride gas.

Section 11 - Toxicological Information

Acute Effects

Information on likely routes of exposure

Product Information

Inhalation	Not an expected route of exposure.
Eyes	Avoid contact with eyes. Corrosive to the eyes and may cause severe damage including blindness. Risk of serious damage to eyes. Lachrymator (substance which increases the flow of tears).
Skin	Avoid contact with skin. Causes burns. Skin Corrosion/Irritation. Contact with moist skin may cause skin burns.
Ingestion	May be harmful if swallowed.

Numerical measures of toxicity

(a) acute toxicity;	
Oral	Category 4
Dermal	Based on available data, the classification criteria are not met
Inhalation	Category 1

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Phosphorus trichloride	18 mg/kg (Rat)	LD50 250 - 500 mg/kg (Rabbit)	104 ppm/4h (Rat)

Phosphorus oxychloride	LD50 = 380 mg/kg (Rat)	LD50 > 250 mg/kg (Rabbit)	LC50 = 308 mg/m ³ (Rat) 4 h
Thiophosphoryl chloride	660 mg/kg (Rat)		0.14 mg/L/4h (Rat)

(b) skin corrosion/irritation; Category 1 B

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;

Respiratory
Skin

Based on available data, the classification criteria are not met

Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Based on available data, the classification criteria are not met

(f) carcinogenicity; Based on available data, the classification criteria are not met

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Category 3

Results / Target organs

Respiratory system

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met

Target Organs

None known.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Other Adverse Effects

The toxicological properties have not been fully investigated.

Symptoms / effects, both acute and delayed

Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. After inhalation exposure, observe for 24 to 72 hours as pulmonary edema may be delayed.

Section 12 - Ecological Information

Ecotoxicity

Aquatic ecotoxicity

Do not empty into drains. Contains a substance which is: Harmful to aquatic organisms. The product contains following substances which are hazardous for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Reacts with water so no ecotoxicity data for the substance is available.

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Phosphorus trichloride	LC50: > 1000 mg/L, 96h static (Danio rerio)			
Thiophosphoryl chloride	LC50: = 99 mg/L, 96h static (Brachydanio rerio)			

Terrestrial ecotoxicity There is no data for this product

Persistence and Degradability

Persistence Soluble in water, Persistence is unlikely, based on information available.

Degradability Reacts with water.
Degradation in sewage treatment plant Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants. Water reactive.

Bioaccumulative Potential Bioaccumulation is unlikely Product does not bioaccumulate due to reaction with water

Mobility The product is water soluble, and may spread in water systems. Reacts with water. Will likely be mobile in the environment due to its water solubility. Is not likely mobile in the environment. Highly mobile in soils

Other adverse effects

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

Section 13 - Disposal Considerations

Waste treatment methods

Waste from Residues/Unused Products Do not allow into drains or watercourses or dispose of where ground or surface waters may be affected. Wastes, including emptied containers, are controlled wastes and should be disposed of in accordance with all federal, E.P.A., state and local regulations. Assure conformity with all applicable regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

Other Information Disposal agencies or waste contractors must comply with the New Zealand Hazardous Substances (Disposal) Regulations . Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Large amounts will affect pH and harm aquatic organisms. Do not let this chemical enter the environment.

Section 14 - Transport Information

Component	Hazchem Code
Phosphorus trichloride 7719-12-2 (1-3)	4WE
Phosphorus oxychloride 10025-87-3 (0.1-1)	4WE
Thiophosphoryl chloride 3982-91-0 (>95)	4WE

NZS 5433:2020

UN-No UN1837
Proper Shipping Name THIOPHOSPHORYL CHLORIDE
Hazard Class 8
Packing Group II

IATA

UN-No UN1837
Proper Shipping Name THIOPHOSPHORYL CHLORIDE
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN1837
Proper Shipping Name THIOPHOSPHORYL CHLORIDE
Hazard Class 8
Packing Group II

Environmental hazards No hazards identified

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable, packaged goods

Special Precautions No special precautions required. Please refer to the applicable dangerous goods regulations for additional information.

Additional information None known

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

National Regulations

There are no applicable tolerable exposure limits or environmental exposure limits according to the EPA Controls for Hazardous Substances

Certified handlers, tracking and controlled substance license requirements

Certified handlers are required for some substances. This includes substances requiring a controlled substance license, and most explosives, vertebrates toxic agents, and certain fumigants. Acutely toxic substances which are a Category 1 or 2, such as pesticides also require Certified handlers. Please check the Health and Safety at Work Act 2015 for further information. Tracking is required for some highly hazardous substances. These substances need to be under the control of an appropriately trained person or appropriately secured. Please check the Health and Safety at Work Act 2015 for further information.

Prohibition or notification/licensing requirements

Shown below are details of specific prohibition/notifications or licencing requirements when they apply.

International Regulations

Ozone Depletion Potential This product does not contain any known or suspected substance

Persistent Organic Pollutant This product does not contain any known or suspected substance

Rotterdam Convention (PIC) Not applicable

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)

Phosphorus trichloride	-	Use restricted. See item 75. (see link for restriction details)	-
Phosphorus oxychloride	-	Use restricted. See item 75. (see link for restriction details)	-

<https://echa.europa.eu/substances-restricted-under-reach>

International Inventories

New Zealand (NZIoC), Australia (AICS), Europe (EINECS/ELINCS/NLP), Korea (KECL), China (IECSC), Taiwan (TCSI), Japan (ENCS), Japan (ISHL), Canada (DSL/NDSL), Philippines (PICCS). US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

Component	CAS No	NZIoC	AICS	EINECS	ELINCS	NLP	KECL	IECSC	TCSI
Phosphorus trichloride	7719-12-2	X	X	-	-	-	KE-28723	X	X
Phosphorus oxychloride	10025-87-3	X	X	233-046-7	-	-	KE-28728	X	X
Thiophosphoryl chloride	3982-91-0	-	X	223-622-6	-	-	KE-33800	X	X

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	DSL	NDSL	PICCS	ISHL	ENCS
Phosphorus trichloride	7719-12-2	X	ACTIVE	X	-	X	X	X
Phosphorus oxychloride	10025-87-3	X	ACTIVE	X	-	X	X	X
Thiophosphoryl chloride	3982-91-0	X	ACTIVE	-	X	X	X	X

Legend: X - Listed '-' - Not Listed

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

Section 16 - Other Information

This safety data sheet complies with the requirements of the EPA Hazardous Substances (Hazard Classification) Notice 2020 and WorkSafe New Zealand Regulations

Legend

NZIoC - New Zealand Inventory of Chemicals

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

IECSC - Chinese Inventory of Existing Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

NZS 5433:2020 - Transport of Dangerous Goods on Land

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

WEL - Workplace Exposure Limit

DNEL - Derived No Effect Level

POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

VOC - (Volatile Organic Compound)

AICS - Australian Inventory of Chemical Substances

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

ENCS - Japanese Existing and New Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

CAS - Chemical Abstracts Service

ACGIH - American Conference of Governmental Industrial Hygienists

PNEC - Predicted No Effect Concentration

OECD - Organisation for Economic Co-operation and Development

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

LC50 - Lethal Concentration 50%

ATE - Acute Toxicity Estimate

RPE - Respiratory Protective Equipment

NOEC - No Observed Effect Concentration

BCF - Bioconcentration factor

PBT - Persistent, Bioaccumulative, Toxic

Key literature references and sources for data

HSNO classifications provided in the New Zealand Chemical Classification Information Database (CCID).

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

EPA Guide to classifying hazardous substances in New Zealand

EPA - Assigning a product to an existing HSNO approval guide

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Revision Date 02-May-2023

Revision Summary Not applicable

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet