SOLVENT SYSTEMS International, Inc.
Environmental Services

Offer Sheet

Product	Thiophosphoryl Chloride
Quantity	42 drums x 250 kg each
Net weight	23,148 lbs.
Manufacture date	
Availability	One time
Location	Elgin, SC 29045
Date	1/22/26
COA & SDS	Attached below

Brian Svrusis
Solvent Systems International
575 Bennett Road
Elk Grove Village, IL 60007
847-323-6718 call or text
Click here for: Surplus Inventory
Solvent-Systems.com

Thiophosphoryl chloride (also called **phosphorus thiochloride**) is an inorganic **thiophosphoryl halide** with formula **$PSCl_3$**.
It is the **sulfur analog of phosphoryl chloride ($POCl_3$)**, meaning:

- oxygen is replaced by sulfur (**P=S** instead of **P=O**)
- it contains three reactive **P–Cl** bonds

Key technical behavior: $PSCl_3$ is a highly reactive **thionation / thiophosphorylation agent** and **chlorinating intermediate**, used to build **thiophosphate esters** and related organophosphorus sulfur compounds.

Commercial uses for Thiophosphoryl Chloride ($PSCl_3$)
1) Intermediate for organophosphorus pesticides (major historical use)
$PSCl_3$ is widely used as a **core building block** to manufacture **thiophosphate-based agrochemical actives** and intermediates, especially:

- **O,O-dialkyl phosphorothioates / phosphorodithioates**
- insecticide and acaricide intermediates

Commercial value: $PSCl_3$ efficiently introduces the **P=S** functionality required in many crop protection chemistries.

---

2) Intermediate for flame retardants & plastic additives
Used to produce **phosphorothioate / thiophosphate esters** applied as:

- **flame retardant additives**
- **plasticizers** (in some formulations)
- **smoke suppressant / char-promoting additives** in polymers

End markets:

- construction plastics
- electrical/electronics housings
- industrial polymer compounding

---

3) Lubricant additives (antiwear / extreme pressure)
$PSCl_3$ is used to make **thiophosphorus compounds** applied in:

- hydraulic fluids
- gear oils
- metalworking fluids

These sulfur/phosphorus additives can improve:

- **extreme pressure (EP) performance**
- **antiwear properties**
- **boundary lubrication**

---

4) Chemical intermediate for rubber chemicals and specialty thio-phosphorus agents
Used for production of specialty agents used in:

- rubber processing chemicals
- certain vulcanization-related additive chemistries
- anti-degradants (system dependent)

(Commercially this is usually “intermediate supply chain” rather than finished goods.)

---

5) Synthesis reagent for pharmaceutical / fine chemical intermediates (specialty use)
Used as a **reagent** to introduce thiophosphoryl functionality into:

- specialty intermediates
- research chemicals
- fine chemicals requiring sulfur-phosphorus chemistry

Typically used in controlled manufacturing due to its reactivity.

---

6) Thiophosphorylation / chlorination reagent in industrial synthesis
In chemical manufacturing $PSCl_3$ can be used to:

- convert alcohols/phenols into **thiophosphate esters**
- generate reactive thiophosphoryl intermediates for downstream substitution

---

Typical buyer industries

- **agrochemical manufacturers**
- **additive manufacturers (flame retardants / plasticizers)**
- **lubricant additive producers**
- **specialty chemical / fine chemical manufacturers**

Certificate of Analysis

TESTS	SPECIFICATIONS	RESULTS				
		R0320098	R0320099	R0320106	R0320108	R0320109
Description	Colourless to straw colored liquid.	Complies	Complies	Complies	Complies	Complies
Specific gravity, at 27 °C.	1.627 min.	1.629	1.629	1.628	1.629	1.629
% Purity by GC (% Area)	99.0 min.	99.64	99.66	99.57	99.61	99.62
% PCl_3 by GC (% Area)	0.5 max.	0.29	0.28	0.35	0.32	0.32
% $POCl_3$ by GC (% Area)	0.5 max.	0.07	0.06	0.08	0.07	0.06

SAFETY DATA SHEET

Version 6.12
Revision Date 09/06/2024
Print Date 09/07/2024

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

1.1 Product identifiers

Product name : Thiophosphoryl chloride

Product Number : 224294
Brand : Aldrich
CAS-No. : 3982-91-0

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

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 1), H330
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard Statements

H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H402	Harmful to aquatic life.

Precautionary Statements

P260	Do not breathe mist or vapors.
P264	Wash 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.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
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 POISON CENTER/ doctor.
P363	Wash contaminated clothing before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Lachrymator.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Phosphorus thiochloride
Phosphorus sulfochloride

Formula	:	Cl_3PS
Molecular weight	:	169.40 g/mol
CAS-No.	:	3982-91-0
EC-No.	:	223-622-6

Component	Classification	Concentration
thiophosphoryl trichloride		
	Acute Tox. 4; Acute Tox. 1; Skin Corr. 1B; Eye Dam. 1; STOT SE 3; Aquatic Acute 3; H302, H330, H314, H318, H335, H402	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Moisture sensitive.

Storage class
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
required

Body Protection
Acid-resistant protective clothing

Respiratory protection
Recommended Filter type: Filter type ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	stinging
c)	Odor Threshold	No data available
d)	pH	1.7 at 100 g/l at 23 °C (73 °F)
e)	Melting point/freezing point	Melting point/ range: -35 °C (-31 °F) - lit.
f)	Initial boiling point and boiling range	125 °C 257 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	22 hPa at 25 °C (77 °F)
l)	Vapor density	No data available
m)	Density	1.668 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	(decomposition)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	340 °C (644 °F) at 1,013 hPa - DIN 51794
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 750 mg/kg
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
Remarks: (Lit.)
Oral: absorption
LC50 Inhalation - Rat - 4 h - 0.14 mg/l - vapor

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
Remarks: (IUCLID)
Inhalation: absorption
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Corrosive - 4 h
(Draize Test)

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Result: negative
Remarks: (IUCLID)

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Mouse
Cell type: Bone marrow
Application Route: Oral

Result: negative
Remarks: (Lit.)

Test Type: Chromosome aberration test
Species: Rat
Cell type: Bone marrow
Application Route: Oral

Result: negative
Remarks: (Lit.)

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: XN2930000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

Decomposition of the substance with tissue moisture.

Further data:

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - 99 mg/l - 96 h Remarks: (IUCLID)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - > 149 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	

12.2 Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Possible decomposition products in case of hydrolyzis are:
hydrochloric acid
Further information on ecology
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1837 Class: 8 Packing group: II
Proper shipping name: Thiophosphoryl chloride
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1837 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: THIOPHOSPHORYL CHLORIDE

IATA
UN number: 1837 Class: 8 Packing group: II
Proper shipping name: Thiophosphoryl chloride
IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern
Product does not contain any listed chemicals

Vermont Chemicals of High Concern
Product does not contain any listed chemicals

Washington Chemicals of High Concern
Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:
TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.12 Revision Date: 09/06/2024 Print Date: 09/07/2024