

PHOSPHORYL CHLORIDE

GHS Safety Data Sheet

Version No:3

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

PHOSPHORYL CHLORIDE

OTHER NAMES

Cl₃-O-P, Cl₃-O-P, POCl₃, "phosphorous oxychloride", "phosphorus oxytrichloride"

PROPER SHIPPING NAME

PHOSPHORUS OXYCHLORIDE

PRODUCT USE

Chlorinating agent to replace oxygen in organic compounds. Solvent in cryoscopy. Manufacture of cyclic and acyclic esters, petrol additives, hydraulic fluids, and organophosphorus compounds. Dopant for semiconductor grade silicon; manufacture of tricresyl phosphate and fire-retarding agents.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

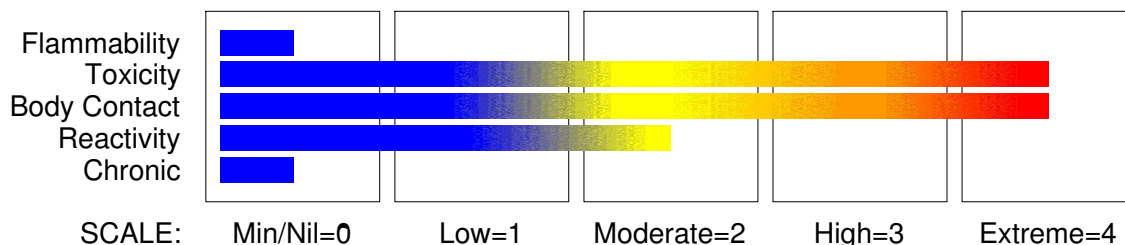
technical@sdfine.com

Telephone: 91- 22- 24959898

Telephone: 91- 22- 24959899

Fax: 91- 22- 24937232

HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Inhalation) Category 1

Acute Toxicity (Oral) Category 2

Metal Corrosion Category 1

Organ Damage Category 1

Skin Corrosion/Irritation Category 1B

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Section 2 - HAZARDS IDENTIFICATION



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H330 H300 H372 H290 H314

Fatal if inhaled

Fatal if swallowed

Causes damage to organs through prolonged or repeated exposure by inhalation.

May be corrosive to metals

Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wear protective gloves/clothing and eye/face protection.

Wash thoroughly after handling.

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

Use only outdoors or in a well ventilated area.

Wear respiratory protection.

Do not breathe dust or mist.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Keep container tightly closed.

Immediately call a POISON CENTER or doctor/physician.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Wash contaminated clothing before reuse.

Get medical advice/attention if you feel unwell.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.

Specific treatment: refer to Label or MSDS.

Absorb spillage to prevent material damage.

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

Storage

Store in a corrosive resistant container with a resistant inliner.

Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
phosphorus oxychloride	10025-87-3	> 99
reacts with water and moist air to produce hydrogen chloride	7647-01-0	
phosphoric acid	7664-38-2	

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is

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Section 4 - FIRST AID MEASURES

contraindicated by excessive swelling

- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
- Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralising agents or any other additives. Several litres of saline are required.
- Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology].

Fats and oils may increase absorption. Use of high carbohydrate and low protein diet as well as attention to fluid and electrolyte balance should be considered for the prevention and treatment of liver injury if absorption is expected [Van Waters & Rogers]

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

DO NOT use water.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- DO NOT use water on fires.
- Avoid spraying water onto liquid pools.
- Do not approach containers suspected to be hot.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Will not burn but increases intensity of fire.

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Section 5 - FIRE FIGHTING MEASURES

- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Heat affected containers remain hazardous.
- Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition.
- May emit irritating, poisonous or corrosive fumes.

Combustion products include:.

hydrogen chloride and phosphorus oxides (PO_x).

FIRE INCOMPATIBILITY

Segregate from alcohol, water.

Personal Protective Equipment

Breathing apparatus.

Gas tight chemical resistant suit.

Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labelled container for waste disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

phosphorus oxychloride 3 ppm

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

phosphorus oxychloride 0.5 ppm

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Section 6 - ACCIDENTAL RELEASE MEASURES

other than mild, transient adverse effects without perceiving a clearly defined odour is:
phosphorus oxychloride 0.5 ppm

The threshold concentration below which most people will experience no appreciable risk of health effects:
phosphorus oxychloride 0.1 ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
R51	$\geq 2.5\%$		
else	$\geq 10\%$		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X



X



+



X



X



+

+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

WARNING: Contact with water generates heat.

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

Glass container.

Glass carboy.

- Check that containers are clearly labelled.

Packaging as recommended by manufacturer.

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PHOSPHORYL CHLORIDE

Section 7 - HANDLING AND STORAGE

STORAGE INCOMPATIBILITY

Avoid strong bases.
Segregate from alcohol, water.
Avoid contact with metals.
Reacts violently with water and may produce flashes of fire.
Sufficient heat may be produced to ignite combustible materials.
Contact with combustible materials, flammable materials, or powdered metals may cause fire or explosion.
Reacts with most common metals (except nickel and lead) to produce hydrogen gas which can form an explosive mixture with air.
Rapid addition of phosphorus oxychloride to dimethylaniline may produce violent reaction.
2,5-Dimethylpyrrole may react violently with a dimethylformamide/phosphorus oxychloride complex.
Explosive reaction may occur between 2,6-dimethylpyridine N-oxide and phosphorus oxychloride in the absence of a suitable diluent.
Reaction of pyridine N-oxide and phosphorus dichloride produces a steady exotherm which may eventually lead to a runaway explosive reaction.
Explosive reaction with dimethylsulfoxide may occur in the absence of suitable diluent.
Avoid contact with organic material, aluminium and dimethyl sulfoxide.
Zinc dusts ignite in contact with a little phosphorus oxychloride.
(subsequent addition of water liberates phosphine which ignites).
Sodium and phosphorus oxychloride interact explosively on heating.
Following interaction with water a considerable delay in the onset of a hydrolysis exotherm occurs following interaction with water. The exotherm may be vigorous enough to generate steam and liberate hydrogen chloride gas. A layer of dense and cold phosphorus oxychloride liquid may survive under water for several minutes before violent reaction.
Disposal of a benzene solution of phosphorus oxychloride into a waste drum containing carbon disulfide (and other solvents) caused an instantaneous reaction, with evolution of (probably) hydrogen chloride.
Presence of a hydroxylic compound is likely.

STORAGE REQUIREMENTS

Store under an inert gas, e.g. argon or nitrogen.

- Keep dry.
- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials.
- Protect containers against physical damage.
- Check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

DO NOT use aluminium or galvanised containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• phosphorus oxychloride:	CAS:10025- 87- 3 CAS:39380- 77- 3
• hydrogen chloride:	CAS:7647- 01- 0 CAS:7698- 05- 7
• phosphoric acid:	CAS:7664- 38- 2 CAS:28602- 75- 7 CAS:178560- 73- 1

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
hydrogen chloride		50
phosphoric acid	1, 000	

ODOUR SAFETY FACTOR (OSF)

OSF=1.3 (phosphorus oxychloride)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

MATERIAL DATA

As phosphorus oxychloride is potentially more toxic than phosphorus trichloride, the TLV-TWA reflects this difference and is thought to be protective against the significant risk of narcosis, systemic poisoning and irritation of the eyes, mucous membranes and skin associated with exposure at higher concentrations.

INGREDIENT DATA

HYDROGEN CHLORIDE:

Odour Threshold Value: 0.262 ppm (detection), 10.06 ppm (recognition)

NOTE: Detector tubes for hydrochloric acid, measuring in excess of 1 ppm, are available commercially.

Hydrogen chloride is a strong irritant to the eyes, mucous membranes and skin. Chronic exposure produces a corrosive action on the teeth. Reports of respiratory irritation following short-term exposure at 5 ppm have lead to the recommended TLV-C. There is no indication that skin contact with hydrogen chloride elicits systemic poisoning and a skin designation has not been applied.

Exposure of humans to hydrogen chloride at 50 to 100 ppm for 1 hour is reported to be barely tolerable; 35 ppm caused irritation of the throat on short exposure and 10 ppm was the maximal concentration for prolonged exposure. It has been stated that hydrogen chloride at concentrations of 5 ppm is immediately irritating.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

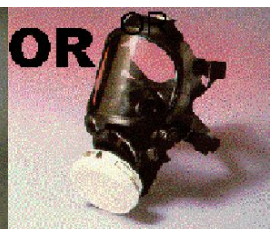
PHOSPHORIC ACID:

The saturated vapour concentration of phosphoric acid exceeds the TLV.

The TLV-TWA is based by analogy from comparable experience and data for sulfuric acid. Exposure at or below this limit is thought to prevent throat irritation amongst unacclimatised workers.

Fumes of phosphorus pentoxide at concentrations between 0.8 and 5.4 mg/m³ were reported to be noticeable but not uncomfortable whilst concentrations between 3.6 and 11.3 mg/m³ produced coughing in unacclimatised workers but were tolerable. Concentrations of 100 mg/m³ were unbearable except in inured workers.

PERSONAL PROTECTION



EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

Neoprene gloves.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.
- Ensure there is ready access to a safety shower.

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the: "Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the computer-generated selection: phosphorus oxychloride

Protective Material

TEFLON

A

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	B- AUS P	-
1000	50	-	B- AUS P
5000	50	Airline *	-
5000	100	-	B- 2 P
10000	100	-	B- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.

An approved self contained breathing apparatus (SCBA) may be required in some situations.

Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:
solvent, vapours, degreasing etc., evaporating from tank (in still air).
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

Air Speed:
0.25- 0.5 m/s (50- 100 f/min.)

0.5- 1 m/s (100- 200 f/min.)

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Colourless, clear, strongly fuming liquid with pungent odour; reacts with water and alcohol.

PHYSICAL PROPERTIES

Liquid.
Corrosive.
Acid.
Toxic or noxious vapours/gas.
Reacts violently with water.

Molecular Weight: 153.35
Melting Range (°C): 1.25
Solubility in water (g/L): Reacts violently
pH (1% solution): < 7
Volatile Component (%vol): 100
Relative Vapour Density (air=1): 5.3
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not applicable
State: Liquid

Boiling Range (°C): 105.8
Specific Gravity (water=1): 1.645
pH (as supplied): Not available
Vapour Pressure (kPa): 3.73 @ 20 C
Evaporation Rate: Not available
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not applicable
Decomposition Temp (°C): Not available
Viscosity: Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

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Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.

EYE

The material can produce severe chemical burns to the eye following direct contact.

Vapours or mists may be extremely irritating.

When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

The material can produce severe chemical burns following direct contact with the skin.

Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

Open cuts, abraded or irritated skin should not be exposed to this material.

The material may accentuate any pre-existing skin condition.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation.

Acidic corrosives produce respiratory tract irritation with coughing, choking and mucous membrane damage. Symptoms of exposure may include dizziness, headache, nausea and weakness. In more severe exposures, pulmonary oedema may be evident either immediately or after a latent period of 5-72 hours. Symptoms of pulmonary oedema include a tightness in the chest, dyspnoea, frothy sputum and cyanosis. Examination may reveal hypotension, a weak and rapid pulse and moist rates. Death, due to anoxia, may occur several hours after onset of the pulmonary oedema.

The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation.

Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).

The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs. Therefore prolonged exposure to respiratory irritants may cause sustained breathing difficulties.

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Section 11 - TOXICOLOGICAL INFORMATION

CHRONIC HEALTH EFFECTS

Principal routes of exposure are by accidental skin and eye contact and by inhalation of vapours especially at higher temperatures.

Chronic respiratory disease and pulmonary disease are aggravated by exposure. Chronic effects of exposure include bronchial irritation, coughing, pneumonia and pulmonary oedema. Changes may occur in bone, brain, kidney and liver.

TOXICITY AND IRRITATION

TOXICITY

Oral (rat) LD50: 380 mg/kg

Inhalation (rat) LC50: 32 ppm/4h

IRRITATION

Nil Reported

HYDROGEN CHLORIDE:

TOXICITY

Inhalation (human) LCLo: 1300 ppm/30m

Inhalation (human) LCLo: 3000 ppm/5m

Inhalation (rat) LC50: 3124 ppm/60m

4701 ppm/30m

IRRITATION

Eye (rabbit): 5 mg/30s - Mild

PHOSPHORIC ACID:

TOXICITY

Unreported (human) LDLo: 220 mg/kg

Oral (rat) LD50: 1530 mg/kg

Oral (rat) LD50: 3500 mg/kg* [Monsanto]*

Dermal (rabbit) LD50: >1260 mg/kg*

IRRITATION

Skin (rabbit):595 mg/24h - SEVERE

Eye (rabbit): 119 mg - SEVERE

The material may produce severe irritation to the eye causing pronounced inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

phosphoric acid (85%)

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

PHOSPHORIC ACID:

Fish LC50 (96hr.) (mg/l): 138

continued...

PHOSPHORYL CHLORIDE

Section 12 - ECOLOGICAL INFORMATION

The principal problems of phosphate contamination of the environment relates to eutrophication processes in lakes and ponds. Phosphorus is an essential plant nutrient and is usually the limiting nutrient for blue-green algae. A lake undergoing eutrophication shows a rapid growth of algae in surface waters. Planktonic algae cause turbidity and flotation films. Shore algae cause ugly muddying, films and damage to reeds. Decay of these algae causes oxygen depletion in the deep water and shallow water near the shore. The process is self-perpetuating because anoxic conditions at the sediment/water interface causes the release of more adsorbed phosphates from the sediment. The growth of algae produces undesirable effects on the treatment of water for drinking purposes, on fisheries, and on the use of lakes for recreational purposes. On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and /or delayed, to the structure and/ or functioning of natural ecosystems.

Prevent, by any means available, spillage from entering drains or water courses.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise at an effluent treatment plant.
- Use soda ash or slaked lime to neutralise.
- Recycle containers, otherwise dispose of in an authorised landfill.

WASTE DISPOSAL PROCEDURES

- Collect and package recoverable quantities of phosphoryl chloride into labelled containers for recycling or disposal. Wear nitrile rubber gloves, protective clothing and eye protection to control personal contact from phosphoryl chloride. Work in a well ventilated area, and pour the phosphoryl chloride into a large evaporating dish. Cover with excess solid sodium carbonate or calcium carbonate. Once the reaction has ceased, add the mixture to a container of cold water. Allow to stand for 24 hours. Test the pH of the solution and neutralise if necessary. Empty the solution into the drain with water, flushing with at least 50 times its volume water [Armour 1996].

SPILLAGE DISPOSAL

- Wear nitrile rubber gloves, protective clothing, eye protection and if necessary a self contained breathing apparatus. Cover the spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, bentonite and sand. Once the phosphoryl chloride has been absorbed, transfer the mixture to a well ventilated area. Add the absorbed mixture to a container of cold water. Allow to stand for 24 hours. Test the pH, if necessary neutralise it with sodium carbonate. Empty the solution into the drain with water, flushing with at least 50 times its volume of water. Dispose of the solid with normal refuse [Armour 1996].

PHOSPHORYL CHLORIDE

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Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE
HAZCHEM: 4W

UNDG:

Dangerous Goods Class:	8	Subrisk:	None
UN Number:	1810	Packing Group:	II
Shipping Name: PHOSPHORUS OXYCHLORIDE			

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	1810	Packing Group:	II
EMS Number:	F- A, S- B		
Shipping name: PHOSPHORUS OXYCHLORIDE			

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: IATA

Section 15 - REGULATORY INFORMATION

REGULATIONS

phosphorus oxychloride (CAS: 10025-87-3) is found on the following regulatory lists;
Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (English)
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals
The Australia Group Export Control List: Chemical Weapons Precursors
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established

No data available for phosphorus oxychloride as CAS: 39380-77-3.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
phosphorus oxychloride	10025- 87- 3, 39380- 77 - 3
phosphoric acid	7664- 38- 2, 28602- 75- 7 , 178560- 73- 1

continued...

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Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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