



Product Safety Summary

Phosphorus Trichloride

CAS No. 7719-12-2

This Product Safety Summary is intended to provide a general overview of the chemical substance. The information in the summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found in the Safety Data Sheet (SDS) for the chemical substance.

Names

- Phosphorus trichloride
- Phosphorus (III) chloride
- Phosphorous chloride
- PCl_3

Product Overview

Solvay Novecare does not sell phosphorus trichloride directly to consumers and phosphorus trichloride has no known uses except as an intermediate to produce other chemicals. Phosphorus trichloride (PCl_3) is used as a chemical intermediate to produce a variety of products which are used in several applications including agricultural products, surfactants and metal extractants, flame retardants, additives for lubricants and stabilizers for plastics.

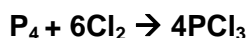
Phosphorus trichloride is used in industrial applications and other processes where workplace exposures can occur. Consumer exposure does not occur as phosphorus trichloride is not used in any commercially available product. **Phosphorus trichloride is dangerous to human health. Phosphorus trichloride may be fatal if inhaled, highly toxic if swallowed, harmful if absorbed through skin and can cause severe burns which may result in scarring.**

Phosphorus trichloride is consumed in manufacturing processes. PCl_3 can make its way into the environment through unintentional releases (spills). PCl_3 will not bioaccumulate but is not biodegradable. Based on ecotoxicological testing performed on fish and fresh-water invertebrates, PCl_3 in higher concentrations can be harmful to aquatic life due to formation of acids from the hydrolysis of PCl_3 . When released into the atmosphere, phosphorus trichloride exists as vapor. The vapors hydrolyze to hydrochloric and phosphoric acids from reaction with humidity in the air.



Manufacture of Product

Phosphorus trichloride is produced by the reaction of elemental (white) phosphorus (P₄) with chlorine (Cl₂).



Product Description

Phosphorus trichloride is a colorless fuming liquid with a pungent odor. Typical physical properties for PCl₃ are provided in Table 1.

Table 1: Typical physical properties of phosphorus trichloride

	PCl ₃
Purity	> 99.5%
Specific gravity	1.58 at 140°F (60°C)
Boiling point	167°F (75°C) at 760 mmHg
Freezing point	-170°F (-112°C)
Flammability	Not flammable
Flash Point	Not applicable

Product Uses

Phosphorus trichloride is used as a chemical intermediate to produce a wide range of chemicals. The most common use is in the production of pesticides particularly the large volume herbicide, glyphosate, and organophosphate insecticides. PCl₃ is also used to produce phosphorus oxychloride which itself is an intermediate used to produce flame retardants. Other uses include production of surfactants and metal extractants used for water treatment, plastic additives including plasticizers and stabilizers, and miscellaneous products including lube oil and paint additives. PCl₃ can be used to produce nerve gas chemical weapons by multistage chemical synthesis. Because of this, its production, use and export are stringently controlled by an International Chemical Weapons Convention treaty. **Solvay Novcare does not sell phosphorus trichloride directly to consumers and phosphorus trichloride has no known uses except as an intermediate to produce other chemicals.**



Exposure Potential

- **Workplace Exposure** - PCl_3 is toxic by ingestion, inhalation or contact with skin and eyes. Exposures can occur at a PCl_3 manufacturing facility or at a manufacturing facility that uses PCl_3 as an intermediate to produce other chemicals. Exposure may also occur in the event of a transportation incident. Persons involved in maintenance, sampling and testing activities, or in the loading and unloading of PCl_3 containers are at greater risk of exposure. Following good safe handling practices will minimize the likelihood of PCl_3 exposure. Persons involved in higher risk activities should always wear proper personal protective equipment such as an air-supplied positive pressure respirator, rubber gloves and boots, a chemical resistant suit, goggles, face shield and a hard hat. Under emergency conditions the use of a full-face positive pressure air-supplied respirator equipped with an emergency escape supply unit or a self-contained breathing apparatus should be used

Solvay Novecare conducts an on-site inspection of potential industrial customers, prior to selling them PCl_3 . The group also works closely with customers to ensure that they have the ability (the equipment and the expertise) to handle this material safely and securely. Because of the sensitive nature of this product, access to the Safety Data Sheet is limited to approved customers. Please consult the appropriate Safety Data Sheet for more information on PCl_3 exposures and for information concerning exposure limits.

- **Consumer Exposure to Products Containing Phosphorus Trichloride** - Solvay Novecare does not sell PCl_3 directly to consumers and there are no known uses of PCl_3 other than as a chemical intermediate. Therefore consumer exposures are not anticipated.
- **Environmental Releases** - Spills of PCl_3 create an emergency situation and require evacuation of the area. Personnel, except properly equipped and trained emergency responders, should be excluded. The leak should be stopped if safe to do so and the area diked using absorbent or impervious materials. Any free liquid can be pumped to an appropriate closed container. Material can be absorbed with vermiculite or other inert absorbent. Clean-up of residual material can be done using a 2-5% solution of soda ash. Disposal should be in accordance with applicable local, state or federal regulations. Persons attempting to clean up PCl_3 spills should wear proper personal protective equipment, (See guidelines in the Safety Data Sheet.) If required, report spills to the appropriate local, state and federal authorities.
- **Fires** - PCl_3 is not flammable. However, PCl_3 reacts violently with water releasing heat and corrosive materials. Under fire conditions, toxic, corrosive fumes are emitted. Water is not recommended as an extinguishing method. Recommended methods include: dry sand, carbon dioxide, or dry chemical. For additional information concerning PCl_3 emergency response procedures, please consult the Safety Data Sheet.



Health Information

PCl_3 is corrosive and toxic by ingestion, inhalation or contact with skin and eyes. Effects can be immediate. In the event of exposure to the skin or eyes the area should be washed with water for at least 30 minutes. Please consult the Safety Data Sheet for additional information.

Exposures to PCl_3 can produce the following adverse health effects:

- **Contact** - Skin exposures to phosphorus trichloride can cause severe burns due to formation of acid hydrolysis products. Eye exposures to PCl_3 may result in severe eye irritation, burns or even blindness.
- **Inhalation** - PCl_3 is corrosive to the respiratory tract if inhaled. It can cause upper respiratory tract irritation, lung irritation, chest pain, wheezing, and shortness of breath, a burning sensation, tickling of the nose and throat and sneezing. Exposure to high levels of PCl_3 may cause severe lung damage including pulmonary edema and may be fatal
- **Ingestion** - Phosphorus trichloride is harmful if ingested. It can cause irritation, abdominal pain, corrosion, burns to mouth and esophagus and death.
- **Other Effects** - Phosphorus trichloride is quickly hydrolyzed at first contact with water therefore it is very unlikely that PCl_3 will reach tissues distant from the point of entry. Systemic effects are not anticipated. PCl_3 has been negative in mutagenicity and reproductive studies. No carcinogenicity studies were identified. For more information on health effects or for information concerning proper first aid measures, please consult the Safety Data Sheet.

Environmental Information

Phosphorus trichloride is rapidly hydrolyzed upon contact with water and will therefore be degraded within the wastewater treatment process. Due to this rapid degradation, an exposure to surface waters is expected to be negligible. Since ecotoxicological effects of the substance solely result from changes in pH, PCl_3 is not considered to be acutely harmful to aquatic organisms except for possible effects from acidity. Further, phosphorus trichloride does not accumulate in the food chain.

For more ecological and environmental information concerning this product, please consult the Safety Data Sheet.

Physical Hazard Information

PCl_3 is stable under normal handling and storage conditions. **Phosphorus trichloride reacts violently with water to produce hydrogen chloride gas (HCl) and phosphorous acid (H_3PO_3). The reaction is extremely exothermic, releasing a dense cloud of hydrogen chloride gas, steam and phosphorous acid mist.** Conditions to be avoided include: combustible materials, heat, water, extreme humidity, moisture, strong oxidizing agents, bases, acids, metals, ketones, organic material, alcohols, amines, and alkali materials. **Special warning: PCl_3 can react with trimethylolpropane, trimethylolpropane derived products or their corresponding trimethylol**



alkane homologs to produce bicyclic phosphates and/or phosphites, which can have acute neurotoxic properties which may cause convulsions.

For more information concerning the physical hazards of this product, please consult the Safety Data Sheet.

Regulatory Information

Regulations may exist that govern the manufacture, sale, export, import, storage, transportation, use and/or disposal of this chemical. These regulations can vary by city, state, country or geographic region. Information may be found by consulting the relevant Safety Data Sheet specific to your country or region.

Additional Information

- Solvay USA Inc. www.solvaynorthamerica.com
- Phosphorus Trichloride SIDS Initial Assessment Report for SIAM 19, October 19-22, 2004 <http://www.inchem.org/documents/sids/sids/7719122.pdf>
- NJ Department of Health & Senior Services Hazardous Substance Fact Sheets <http://web.doh.state.nj.us/rtkhsfs/factsheets.aspx>
- This summary was prepared in December, 2013

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