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Material Safety Data Sheet

Phosphorus pentachloride MSDS

Section 1: Chemical Product and Company Identification

Product Name: Phosphorus pentachloride

Catalog Codes: 11192

CAS#: 10026-13-8

RTECS: TB6125000

TSCA: TSCA 8(b) inventory: Phosphorus pentachloride

CI#: Not available.

Synonym: Phosphorane, Pentachloro-; Phosphoric Chloride; Phosphorus Perchloride

Chemical Name: Phosphorus Pentachloride

Chemical Formula: PCl₅

Contact Information:

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Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Phosphorus pentachloride	10026-13-8	100

Toxicological Data on Ingredients: Phosphorus pentachloride: ORAL (LD50): Acute: 660 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive), of eye contact (corrosive). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to mucous membranes. The substance may be toxic to kidneys, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated

exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Corrosive solid. Poisonous solid. Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from direct sunlight or strong incandescent light. Do not ingest. Do not breathe dust. Never add water to this product. Avoid shock and friction. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m³) from OSHA (PEL) [United States] TWA: 0.1 (ppm) from ACGIH (TLV) [United States] TWA: 1 (mg/m³) from NIOSH [United States] TWA: 0.1 (ppm) [United Kingdom (UK)] TWA: 0.87 (mg/m³) [United Kingdom (UK)]³ Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Deliquescent solid. Crystalline solid.)

Odor: Unpleasant. Pungent.

Taste: Not available.

Molecular Weight: 208.24 g/mole

Color: White to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 159°C (318.2°F) - 160 C (sublimes)

Melting Point:

Sublimation temperature: 160°C (320°F) - 165 C (Sax & Lewis, 1987) Sublimation temperature: 167 C (Sittig, 1985)
Sublimation temperature: 100 C (Budavari, 1989) Sublimes at about 100 C without melting (Merck Index, 13th ed., 2001)
Melting point: 148 C (under pressure) (Merck Index, 13th ed., 2001) (Budavari, 1989)

Critical Temperature: 372°C (701.6°F)

Specific Gravity: Density: 2.114 - 3.60(Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Decomposes in cold water, and in acid. Soluble in Carbon Disulfide, and Carbon Tetrachloride

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, moisture, water

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Reacts with alcohols to form the corresponding chloride. Fuming in moist air. It will react with water or steam to produce heat as well as toxic and corrosive fumes. It is hydrolyzed by water to form phosphoric acid, and hydrogen chloride. Reacts violently with water, ClO₃, Hydroxylamine, Magnesium oxide, Nitrobenzene, Phosphorus (III) oxide, Potassium. It is also incompatible with the following: Aluminum, Chlorine dioxide, Chlorine, Diphosphorus trioxide, Fluorine, Magnesium oxide, sodium, 3'-Methyl-2-nitrobenzanilide,

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC₅₀ VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD₅₀): 660 mg/kg [Rat]. Acute toxicity of the vapor (LC₅₀): 205 8 hours [Rat].

Chronic Effects on Humans:

Causes damage to the following organs: mucous membranes. May cause damage to the following organs: kidneys, liver.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive), of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes severe skin irritation and burns. Eyes: Causes severe irritation and burns of the eyes. Inhalation: Toxic if inhaled. Causes severe respiratory tract irritation and burns. Phosphorus chlorides are extremely

destructive to the tissues (mucous membranes) of the respiratory tract. Inhalation may result in burning sensations, coughing, wheezing, shortness of breath, spasm, inflammation and edema of the larynx, and bronchi, chemical pneumonitis, and pulmonary edema. It may also affect behavior/central nervous system (somnolence, dizziness, headache, muscle contraction or spasticity, muscle weakness). Ingestion: Harmful if swallowed. Causes severe irritation and burns, nausea, and vomiting. Ingestion will lead to a strong corrosive effect on the mouth and throat and to the danger of perforation of the esophagus and stomach. It may also affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Prolonged or repeated exposure by inhalation and ingestion may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Phosphorous pentachloride UNNA: 1806 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Phosphorus pentachloride Illinois toxic substances disclosure to employee act: Phosphorus pentachloride Illinois chemical safety act: Phosphorus pentachloride New York release reporting list: Phosphorus pentachloride Rhode Island RTK hazardous substances: Phosphorus pentachloride Pennsylvania RTK: Phosphorus pentachloride Minnesota: Phosphorus pentachloride Massachusetts RTK: Phosphorus pentachloride Massachusetts spill list: Phosphorus pentachloride New Jersey: Phosphorus pentachloride New Jersey spill list: Phosphorus pentachloride Louisiana RTK reporting list: Phosphorus pentachloride California Director's list of Hazardous Substances: Phosphorus pentachloride TSCA 8(b) inventory: Phosphorus pentachloride SARA 302/304/311/312 extremely hazardous substances: Phosphorus pentachloride CERCLA: Hazardous substances.: Phosphorus pentachloride

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS E: Corrosive solid. CLASS F: Dangerously reactive material.

DSCL (EEC):

R14- Reacts violently with water. R22- Harmful if swallowed. R26- Very toxic by inhalation. R34- Causes burns. S7/8- Keep container tightly closed and dry. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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