

(7) Phosphorus pentachloride PCl_5
CAS No. 10026-13-8
HS No. 28.12.10.10
TDG 1806
NIOSH/RTECS No. TB 6125000
Merck 7326

Synonyms: Phosphoric chloride, phosphorous perchloride

Physical Properties: MW: 208.22, mp: 179-181°, d 1.6. It is a yellowish-white crystalline mass with a pungent odour and it fumes in air.

Synthesis: It is made from PCl_3 and chlorine or by burning phosphorous in excess chlorine. It is made either by batch or continuous processing. In the batch process, PCl_3 is dissolved in carbon tetrachloride and the chlorine gas added above the liquid level when crystals of PCl_5 are formed. In the continuous process the trichloride is run countercurrent to the chlorine and the PCl_5 collected at the bottom of the tower.

Reactivity: It reacts violently with water and explosively with chlorine dioxide, urea, fluorine and many other substances. On decomposition, it emits highly toxic fumes containing PO_x and halide ions.

Toxicology: It is a severe irritant to eye, skin and mucous membranes. It is poisonous by inhalation and ingestion. The LD_{50} is 660 mg/kg (rat) and it is corrosive to body tissues. It is on the EPA extremely hazardous substance list and reported on the EPA TSCA inventory.

Uses: It is used as a catalyst, chlorinating and dehydrating agent and in the manufacture of chlorophosphazenes.

Suppliers: Four suppliers are listed in the World Directory: India(1), Japan (2) and Germany (1). The SRI directory lists one US manufacturer.