



Technical Bulletin - KPM-106

Safe Use and Handling of Phosphorus Oxychloride - POCl_3

CAS Number: **10025-87-3**

Packing Group: **II**

Hazard Classification: **8, 6.1**

About Us

Kredence Electronics Materials India Pvt. Ltd has been providing high quality, photovoltaic grade chemicals to their customers throughout India and internationally since 2015. We at Kredence are committed to customer satisfaction achieved by clearly understanding the customers' needs and fulfilling those requirements through continual improvement of products, services, and the quality management system. In addition to that, **our company values the safety and well-being of our employees, customers, community, and the environment surrounding us. Our highly trained and experienced staff uses specialized equipment and technology to certify our customers receive quality service. Kredence Electronics Materials performs routine sample analysis to ensure grade specification requirements are met.**

Purpose

When working with hazardous materials on a day-to-day basis, it is important to be aware of the chemicals' properties, risks, and safety precautions that need to be followed. This Technical Bulletin serves the purpose to educate our customers and employees about the chemical nature, safety, and provisions associated with Phosphorus Oxychloride (POCl_3).

Phosphorus Oxychloride 7N (POCl_3) PV Grade is currently provided Kredence Electronics Materials India Pvt. Ltd

Product Overview

Phosphorus Oxychloride is a colorless, fuming liquid with a strong odour. The liquid has an oily texture and a density of 1.64g/cm^3 . It is highly incompatible with water, water vapor, acids, alcohols, and alkali; in the presence of water and water vapor, POCl_3 will react violently. Hydrolysis of this liquid will decompose phosphorus oxychloride into hydrochloric acid and phosphoric acid. Because of its corrosive and reactive nature, POCl_3 has been listed on the Special Health Hazard Substance List. The liquid is soluble in benzene, carbon disulphide, carbon tetrachloride and chloroform. Phosphorus oxychloride is used in making semiconductors, gasoline additives, plasticizers, hydraulic fluids, and pesticides. Phosphorus Oxychloride PV Grade (POCl_3), which is offered by our company, is used in: photovoltaic industry as a dopant to increase the electrical conductivity of silicon wafers used in solar energy production. POCl_3 is harmful to your health if exposed to, and therefore, safety and precautionary measures need to be taken while working with this chemical. Refer to [OSHA](#) for exposure limit guidelines.

Safety

- ALWAYS wear appropriate PPE (gloves, face mask/ face shield, covered footwear, apron/ long clothing, respirator where necessary)
- If possible, enclose operations and use local exhaust ventilation, or wear a respirator.



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- Post hazards and warnings associated with exposure to POCl_3 , in the work area.
 - Educate workers on safe handling of hazardous materials
 - In case of a Fire Hazard, extinguish with dry chemicals or carbon dioxide. DO NOT use water, unless used in large amounts that outweigh the amount of heat and acid build-up.
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Handling

- Refer to physical and chemical properties before beginning work
 - Keep away from incompatible (especially water), organic, and oxidizing materials.
 - ALWAYS follow precautionary procedures when handling POCl_3 .
 - Wash thoroughly after working with this material.
 - DO NOT eat, drink, or smoke when handling POCl_3
 - Properly hold and handle container in which contents are filled
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Storage

- Keep in a cool, DRY, ventilated area
 - Make sure the storage container is tightly closed. (DO NOT allow any water or moisture to enter)
 - Store separately from incompatible materials
 - Avoid storing on wooden floors.
 - Store in a glass or glass-lined container. (Kredence Electronics Materials uses quartz bubblers)
 - Refer to Figure 1 on Page 3 for appropriate storage container
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Transport

- Transported in glass containers. Bulk POCl_3 (15K-30K liters) is transported in nickel-clad tanks
 - Transporter(s) should be well aware of the risks associated with this material.
 - Chemical should be transported with compatible material only.
 - Containers should be tightly closed to ensure fumes do not escape into the environment.
 - Follow proper packaging instructions for safe transport (Refer to Figure 2 on Page 3.)
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***If exposed to Phosphorus Oxychloride, immediately follow First-Aid procedures as stated in MSDS.**

*** IMMEDIATE MEDICAL ATTENTION REQUIRED IF EXPOSED TO POCl_3 ***

References

- 1.) A.G. Novikov, O.V. Sobolev, G.V. Tihonov, "The structure and dynamic properties of liquid phosphorus oxychloride POCl_3 from neutron scattering experiments," *Journal of Molecular Liquids*, Elsevier B.V., Jan. 2003, Volume 102, Issues 1–3, Pages 111-128, ISSN 0167-7322, [https://doi.org/10.1016/S0167-7322\(02\)00057-0](https://doi.org/10.1016/S0167-7322(02)00057-0).
- 2.) National Center for Biotechnology Information. "PubChem Compound Summary for CID 24813, Phosphorus oxychloride" *PubChem*, <https://pubchem.ncbi.nlm.nih.gov/compound/Phosphorus-oxychloride>. Accessed 8 February, 2021.

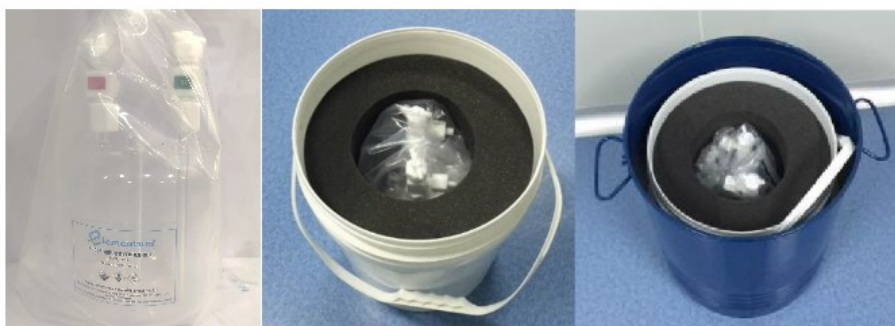


3.) National Library of Medicine, "Phosphorus Oxychloride," NLM Support Center, Bethesda, MD, USA, Updated: May(7), 2020.

<https://webwiser.nlm.nih.gov/substance?substanceId=460&identifier=Phosphorus%20Oxychloride&identifierType=name&multemId=2&catId=163>. Accessed: 9 Feb 2021.



Figure 1: Phosphorus Oxychloride stored in a quartz bubbler apparatus with proper labeling for safety. Refer to Technical Bulletin - KPM-201 for bubbler handling instructions.



Bubbler with plastic bag

Bubbler put in the plastic drum with lining

Plastic drum put in the steel drum with lining

Figure 2: As shown above, we use multiple layer packaging to protect the bubbler during transport.

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