

Pyrophoric Health Hazard

Pyrophoric chemicals are liquids or solids that have the potential to spontaneously ignite in air at temperatures near 130°F (54°C). They are extremely reactive to oxygen and moisture, so precautions must always be taken to prevent their exposure to air

Eyes: Can cause severe burns to the eyes.

Skin: Can cause severe burns to the skin.

Ingestion: May cause severe and permanent damage to the digestive tract. Can cause severe burns to the gastrointestinal tract. May cause central nervous system depression.

Inhalation: Causes chemical burns to the respiratory tract. Exposure produces central nervous system

depression. May cause drowsiness, unconsciousness, and central nervous system depression. Vapors may cause dizziness or suffocation.

Chronic: Repeated exposure can cause nervous system abnormalities with muscle weakness and damage, motor incoordination, and sensation disturbances.



For general information regarding the safe use of pyrophoric chemicals, please contact DEHS at (612) 626-6002.

If you have any concerns regarding the stability or testing of a chemical, contact the Hazardous Waste Program at (612) 624-1604.



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Pyrophoric Safety Guide



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Pyrophoric Chemical Fact Sheet

Pyrophoric materials are liquids, solids, or gases that have the potential to spontaneously ignite in air at temperatures of 130°F (54°C) or below. They often also have corrosive, water reactive, and peroxide forming properties. Some examples include gases (silane, diborane, phosphine, arsine), liquids (metal – alkyls, -aryls, -vinyls, -carbonyls, or -hydrides), and solids (lithium).

Health Hazards: Pyrophoric materials can ignite spontaneously at or below temperature of 54°C. These materials are often toxic, corrosive, and/or water reactive.

Preventive measures:

a. Information and training: lab managers are responsible to ensure that all personnel handling pyrophoric materials are trained on the hazards, appropriate techniques and procedures for safe handling specific to the pyrophoric

material used, and emergency response.

b. Safe Working Procedures:

Prepare written plan of the work that needs to be performed. Ensure that SOPs, and MSDSs have been read and understood and are available at all times while handling pyrophorics

Never work alone: ensure that at least one more person is present in the lab and aware of your work with pyrophorics

Work with pyrophorics is not allowed outside working hours (7 am to 5 pm)

Ensure that there is clear path to eye wash and emergency shower and that these are operational

A class ABC fire extinguisher must be present. If working with combustible material, class D fire extinguisher should be considered. Class D fire extinguisher should not be used for fires involving organolithium compounds.

Minimize the quantity of pyrophorics purchased and handled at any time. For example, do not transfer more than 50 mL of pyrophoric liquids at a time. If larger quantity is required, use repeated transfers of upto 50 mL of pyrophoric.



Ensure that work surface is clear of any unnecessary objects. Pyrophoric solids must be handled in glove box. Pyrophoric liquid must be handled in either glove box, or fume hood with sash as low as possible.

Ensure that a container with sodium carbonate is immediately available (e.g., within arm's reach) while work with pyrophoric materials is performed.

c. Protective clothing

Storage and disposal:

a. Storage: must ensure that pyrophoric materials are isolated from air and moisture.

- Consult MSDS for appropriate storage location and conditions e.g. nitrogen filled desiccator or glove box.
- Minimize the quantity of pyrophoric material stored.
- If using pyrophoric gases ensure that they are stored in an appropriate gas cabinet.
- Ensure that pyrophoric materials are segregated from other materials.
- Ensure that the storage area and containers are clearly labeled as to the contents.
- Ensure that integrity of storage containers is maintained.

b. Disposal: Prior to disposal, pyrophoric materials must be transferred to an appropriate reaction flask and destroyed (quenched) via hydrolysis and/or neutralization with adequate cooling. Specific quenching procedures appropriate for the material being handled are to be included in the written plan of the work to be performed.

Administrative controls:

a. Check containers for leaks

b. Personal Protective Equipment (PPE):

- Nitrile gloves, safety goggles, and a protective lab coat must be worn at all times when working with pyrophoric chemicals.
- Highly flammable synthetic clothing is to be avoided, as well as loose clothing. Always wear long pants and closed-toe shoes. Long hair should be tied back to prevent ignition in the event of a flash fire.
- Fully enclosed safety goggles or a face shield are preferred, if available, as they offer greater facial protection than safety goggles. Prescription eyeglasses are NOT sufficient protection barrier for pyrophoric chemicals.

c. Use appropriate spill response:

- Small spills: access fire extinguisher (class ABC or class D, as appropriate), remove any flammables from the area around

spill, then completely cover the spill with sodium carbonate, or dry sand. Never use paper to clean up spill, as this increases the risk of igniting the pyrophoric material. Next, quench the spill by slowly adding isopropanol to the area. After quenching is completed, double bag spill residues and manifest through the University's hazardous waste program. Call DEHS at (612) 626-6002 for assistance. If flash fire occurs, dial 911

- Large spills: Do NOT attempt to clean up the spill yourself. Call 911 and evacuate the spill area. Cordon-off the spill area with tape and keep other people from entering. If possible, provide emergency responders with technical information on the chemicals involved. Contact DEHS immediately at (612) 626-6002.
- If any personnel is exposed to or on fire, clothing should be removed and rinsing under the nearest emergency showers should be performed for at least 15 minutes.

d. Emergency Information:

- Eyes: Flush eyes at the emergency eyewash station for 30 minutes. Seek medical attention immediately.
- Skin: Remove any contaminated clothing, in case of flash fire. Rinse skin with copious amounts of water for at least 15 minutes. If larger areas of skin are affected, rinse under the emergency safety shower for at least 15 minutes. If you experience any burning or irritation thereafter, seek medical attention.
- Ingestion: Do NOT induce vomiting. Seek medical attention immediately.
- Inhalation: Remove victim from exposure area to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. Seek immediate medical attention or Call 911 if not breathing.

