



## Standard Operating Procedure (SOP)



### PYROPHORICS

Effective Date: **8/23/2013**

Revised Date: **8/23/2013**

#### INTRODUCTION

Pyrophorics can spontaneously ignite in air. Many pyrophorics are also water reactive, igniting on contact with water or high humidity.

Examples of pyrophoric materials include:

- Organometallic reagents such as alkyllithiums, alkylzincs, alkylmagnesiums (Grignards)
- Some finely divided metal powders.

Specific examples include diborane ( $B_2H_6$ ), diethylzinc ( $Zn(CH_2CH_3)_2$ ), *tert*-butyllithium ( $LiC(CH_3)_3$ ) and diphosphine ( $P_2H_4$ ).

#### GENERAL LAB RULES

1. No eating, drinking, smoking, handling contact lenses, or applying cosmetics in the laboratory.
2. Persons shall wear buttoned lab coat, long pants, safety glasses or goggles and appropriate gloves when working with hazardous chemicals.
3. Mouth pipetting is prohibited; mechanical pipetting devices are to be used at all times.
4. All procedures are performed carefully to minimize the creation of splashes or aerosols.
5. Wash hands
  - after handling chemicals materials,
  - after removing gloves, and
  - before leaving the laboratory.

Prior to working with pyrophorics, the Aldrich Technical Bulletins AL-134, [Handling Air-Sensitive Reagents](#) and AL-164 [Handling Pyrophoric Reagents](#) must be read and all safety precautions followed.

#### POTENTIAL HAZARDS

- Pyrophorics can ignite in air spontaneously.
- Many pyrophorics are water reactive, igniting upon contact with water or humidity in air.
- Synthetic fiber clothing must not be worn when working with PYROPHORICS. In event of fire, synthetic fibers will melt to skin, causing severe damage. Only natural fiber clothing may be worn when working with PYROPHORICS.
- *Check the Safety Data Sheet (SDS) to see if the material presents other hazards, such as corrosivity, teratogenicity, water reactivity, peroxide formation, or systemic effects. If other hazards are present, appropriate safety precautions should be addressed in this SOP.*



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#### HEALTH HAZARDS

- **Inhalation:** May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapors may cause drowsiness and dizziness.
- **Skin:** May be harmful if absorbed through skin. Causes skin burns.
- **Eyes:** Causes eye burns.
- **Ingestion:** May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

#### PERSONAL PROTECTIVE EQUIPMENT

##### EYE PROTECTION

- Safety goggles or face shields shall be worn during operations in which PYROPHORICS are used.
- Ordinary (street) prescription glasses do not provide adequate protection. Adequate safety glasses must meet the requirements of the Practice for Occupational Education Eye and Face Protection (ANSI Z87.1-1989) and must be equipped with side shields.

##### HAND PROTECTION

- Use disposable nitrile gloves when working with PYROPHORICS. Check chemical compatibility chart for breakthrough time when using PYROPHORICS.
- Laboratory personnel should thoroughly wash hands with soap and water before and immediately upon removal of gloves.

##### LAB COATS, ETC.

- Flame resistant lab coat shall be worn (Nomex material or equivalent). Buttoned lab coat, closed toed shoes, long pants and long sleeved NATURAL FIBER clothing shall be worn when handling PYROPHORICS. Protective clothing shall be worn to prevent any possibility of skin contact with PYROPHORICS.

#### WORK PRACTICES

- Prior to working with pyrophorics, the Aldrich Technical Bulletins AL-134, [Handling Air-Sensitive Reagents](#) and AL-164 [Handling Pyrophoric Reagents](#) must be read and all safety precautions followed.
- Prior to working with pyrophorics, Section 6G in *Prudent Practices in the Laboratory* (National Academies Press) must be read.
- Purchase the smallest amount of pyrophoric materials.
- Set up a designated area for work with pyrophoric materials – a chemical fume hood and/or a (dry) glove box (with inert atmosphere, if needed) located within 10 seconds of an eyewash/drench hose, safety shower, and an appropriate fire extinguisher.



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- Incompatible materials and flammable chemicals are to be removed from the area.
- A container of powdered lime or sand should be kept within arm's reach (for covering spills).
- Store and use pyrophoric chemicals under an inert atmosphere or under kerosene as appropriate.
- Mineral oil bubblers must be used to release pressure from reagent or reaction vessels.
- Know the location of the nearest compatible fire extinguisher and how to use it.
- Before conducting the actual procedure, always perform a dry run (without the pyrophoric material) to identify and resolve possible safety hazards.
- Work within sight and/or hearing of at least one other person who is familiar with the hazards and written procedures.

### SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

- Liquid pyrophorics should be stored in sealed containers with PTFE-lined septa to prevent air exposure, and manipulated via syringe or cannula in a chemical fume hood (over a spill tray if possible) with the sash as low as possible.
- Solid pyrophorics must be handled only in an inert atmosphere glove box or glove bag.
- Do not store with incompatible material.

Additional Lab Specific Special Handling/Storage Procedures

### WASTE DISPOSAL

- Excess PYROPHORICS and all waste material containing PYROPHORICS must be placed in a container labeled with the following **"HAZARDOUS WASTE PYROPHORICS"**, AND INCLUDE THE FULL CHEMICAL NAME.
- Contact EHS at x3427 for hazardous waste removal.

### EMERGENCY PROCEDURES

**Emergency Numbers:**

Fire and Medical Emergencies	x5911 (911 on cell phone)
Environmental Health and Safety	x3427



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Hillcrest Urgent Care (employees)	336-760-8999
Student Health (students only)	x5218
Poison Control	800-222-1222

#### FIRST AID

1. If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Call x5911 for medical assistance.
2. In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off in safety shower for at least 15 minutes. Call x5911 for medical assistance.
3. In case of eye contact: Rinse thoroughly with plenty of water at eyewash for at least 15 minutes and call x5911 for medical assistance.
4. If swallowed: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Call x5911 for medical assistance.
5. Call x5911 and describe the extent of injuries.
6. Report all accidental exposures to EHS and Human Resources (employees) or Student Health (students).
7. Complete an [online injury/illness report](#) if there is an over-exposure to the chemical or if there is an accident involving the chemical.

#### SPILL AND ACCIDENT PROCEDURES

In the event of a spill of PYROPHORIC material evacuate area immediately and contact x3427 and x5911, regardless of spill amount.