**Standard Operating Procedure**

**Pyrophoric Chemicals**





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| **Chemical name, CAS:** | **Pyrophoric Chemicals**  |
| **PI:** |  | **Date:** |  |
| **Building:** |  | **Lab #:** |  |

1. **Material Use:**

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| Pyrophoric chemicals are liquids or solids that can **ignite spontaneously on contact with air**, moisture in the air, oxygen, or water. Pyrophoric chemicals are often used in chemistry research labs as catalysts or reagents.Pyrophoric Chemicals Include:* Organo-metallic reagents (i.e. Grignard reagents)
* Alkali earth elements (sodium, potassium, cesium)
* Finely divided metals (Raney nickel, aluminum powder, zinc dust)
* Metal hydrides (sodium hydride, germane, lithium aluminum hydride)
* Alkyl metal hydrides (butyllithium, trimethylaluminum, triethylboron)
* Metal carbonyls (nickel carbonyl, iron pentacarbonyl)
* Gases (arsine, diborane, phosphine, silane)
* Silicon halides (dichloromethylsilane)
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1. **Potential Hazards:**

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| Pyrophoric chemicals are violently reactive with oxygen and/or water and will ignite spontaneously upon exposure to air**. Do not underestimate the hazards of pyrophoric materials**. Before working with pyrophorics, **you must get thorough training from an experienced supervisor.**  |

1. **Engineering Controls:**

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| * All transferring of pyrophoric materials should be done in an **inert-atmosphere glove box**.
* All reactions using pyrophoric materials must be performed under an inert atmosphere in a laboratory hood, glove box, or appropriate engineering control.
* An appropriate fire extinguisher (Class ABC or Class D) must be available in the laboratory.
* An eyewash and safety shower must be readily available near the work area.
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1. **Work Practice Controls:**

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| * **Substitute pyrophoric materials for less hazardous reagents** whenever possible.
* Additional training is required for use of pyrophoric materials. Talk with supervisor and EHS before use.
* **Never work alone with pyrophoric materials.**
* **Keep an appropriate spill kid readily available.** Sand, metal-x, or lime often work well for smothering pyrophoric materials.
* Do not store unnecessary flammable chemicals near the pyrophoric work area.
* Oven dry all glassware, syringes, cannula, and other equipment, and cool in inert atmosphere before working with pyrophoric materials.
* Never use a syringe at its maximum volume. Never exceed 2/3 of the maximum syringe capacity to prevent the syringe plunger from popping out.
* **You must be trained by an experienced lab supervisor before working with pyrophoric materials.**
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1. **Personal protective equipment (PPE):**

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| Lab CoatNomex/Flame Resistant | Chemical Resistant Apron | Splash Goggles | Face Shield | Gloves | Long Pants/Closed-toe Shoes |

1. **Storage:**

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| * Store pyrophoric material according to SDS, and away from any flammable materials.
* Storage in an inert-gas atmosphere (glove box or desiccator) may be a suitable storage area.
* Always ensure that sufficient protective solvent, oil, kerosene, or inert gas remains in the container during storage.
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1. **Waste Disposal:**

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| * Any container with pyrophoric residue must be rinsed with compatible dry solvent three times under inert atmosphere before disposal. Rinsate solvent must be collected and quenched.
* Any unused or unwanted reactive materials must be quenched safely before disposal.
* Do not leave any container with pyrophoric residue open to the atmosphere.
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1. **What to do if exposed:**

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| **If inhaled**Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. **In case of skin contact**Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. **In case of eye contact**Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.  |

1. **Spill Procedure:**

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| **All Spills:**  Immediately evacuate lab. Call 911 if there is any risk of fire or explosion. If there is no risk of fire or explosion, call 303-273-3316 and notify EHS personnel for assistance. If possible to do safely, smother any spill with powdered lime, sand or other extinguishing agent. |

1. **Training and medical monitoring of personnel:**

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| * **Hazardous Waste Generator Training,** **Laboratory Safety Training, and HF Training** with EHS.
* **Lab Specific Training** provided by supervisor that covers: safety expectations, PPE use and storage, SOPs, and emergency response.
* **Pyrophoric Specific Training** provided by experienced supervisor.
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1. **Additional Resources:**

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| * **Sigma Aldrich Technical Bulletin AL-134 –** Handling Air Sensitive Reagents
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**I have read and understand this SOP. I agree to fully adhere to its requirements.**

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| **Last** | **First** | **CWID** | **Signature** | **Date** |
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