Standard Operating Procedure
for work with

Chemical name/class:	**Solvents**	**CAS #:**	
PI:	**Mark Walters**	**Date:**	**November 2, 2018**
Building:	**Fitzpatrick CIEMAS**	**Room #:**	**Cleanroom and Sample Prep**
		Designated Work:	**Chemical processing with Solvent**

1. **Circumstances of Use:**

Solvents are typically used in SMIF for cleaning, resist removal, and "lift-off" metal patterning. Solvents used in SMIF include Acetone, Ethanol, Isopropyl Alcohol (IPA), Methanol, and o-Xylene. Some solvent chemicals are also used in sample preparation for electron microscopy (e.g., ethanol, glutaraldehyde and propylene oxide)

2. **Potential Hazards:**

Consult the Safety Data Sheet (SDS) for the particular solvent you are using

Be aware of these specific hazards:

- Solvents and solvent vapors can produce fire and explosion if ignited
- Solvents may react explosively with oxidizers and acids – always keep solvents separated from acids and oxidizers.
- Solvent liquid and vapors are eye and respiratory tract irritants and may cause kidney damage, narcosis, and paralysis (in simple terms, it damages your kidneys, eyes, lungs and brains). Primary routes of exposure are inhalation, skin absorption, and skin and eye contact with vapors
- Glutaraldehyde is considered particularly hazardous as it can be fatal by inhalation and is a respiratory sensitizer.
- Propylene Oxide is considered particularly hazardous because it is a carcinogen.

3. **Engineering Controls:**

- Always work with solvents in a designated solvent fume hood in the Clean Room or Sample Preparation Lab.
- All SMIF solvent hoods are equipped with a CO2 fire suppression system. If the local hood fire alarm starts to beep (the fire alarm strobe on the hood will also flash) then back away from the hood as the CO2 system will activate 10 seconds after the alarm starts. Alternatively, if there is a fire in the hood the hood's local fire pull alarm can be pulled for immediate release of the CO2 fire suppression.
    - Exit the cleanroom and contact SMIF staff as soon as possible if this occurs
- An eyewash and safety shower are available in the immediate area.

4. **Work Practice Controls:**

- Use only in a designated solvent chemical hood.
- Keep containers closed as much as possible. Only open a container when it is inside a designated solvent chemical hood and you are wearing the proper PPE (section 5).
- Contaminated items are to be disposed of properly as hazardous waste, following SMIF's hazardous waste policy (see section 7).

5. **Personal protective equipment (PPE):**

Cleanroom

- Standard cleanroom attire, which includes nitrile gloves and safety glasses

Sample Prep Lab

- Fastened lab coat
- Nitrile gloves
- Safety glasses or goggles

6. **Transportation and Storage:**

- Solvent solutions must be in sealed shatter-resistant containers and stored in an exhausted chemical cabinet designated for solvents.
- Wear the designated PPE (section 5) when transporting a solvent bottle or container to a chemical hood.

7. **Waste Disposal:**

Liquid Waste

Pour all solvent waste into the solvent hood cup drain for proper disposal. These drains lead into a 5 gallon carboy tank located behind the hood. ***Note: Never pour chlorinated solvents or spin coat chemicals down the solvent cup drains***

Solid Waste

Solid materials that are contaminated with chemical solvent waste (such as wipes, dispensers, etc.) should be packed into a zip lock bag and properly labeled with the type of waste, your name, and date. The waste bag should be completely sealed.

- Bagged, sealed, and labeled solid solvent waste should be placed in one of the solvent waste cans for pickup by SMIF staff. In the cleanroom these are located near the spin coat hoods in the photo area, and in the Sample Prep lab these are located near the solvent hood.
- Empty solvent bottles should be left in the solvent hood for pickup by SMIF staff

8. **Exposures/Unintended contact:**

Contact Employee Occupational Health and Wellness (EOHW) at 919-684-3136 for medical advice on occupational chemical exposures. For an actual chemical exposure

- Flush exposed eyes or skin with water for at least 15 minutes.
- If there is respiratory irritation associated with exposure, remove all persons from the contaminated area and contact the OESO spill team.
- Exposed persons should seek immediate medical attention at the nearest emergency department/
- Call 911 from a campus phone or 919-684-2444 from any phone to request assistance if needed. Contact Employee Occupational Health and Wellness at 919-684-8115 for exposure-related advice.

The work-related injury or illness report found at: http://www.hr.duke.edu/benefits/medical/workcomp/report.php should be completed within 24 hours. Follow-up medical attention should be sought through Duke Employee Occupational Health and Wellness (919-684-3136).

9. **Spill Procedure:**

In the event of a spill, follow SMIF spill procedures and immediately contact SMIF staff. Only SMIF staff and/or appropriate OESO personnel should clean up spills

Spills Contained Inside a Chemical Hood

- Avoid breathing vapors from the spill and leave the immediate area of the chemical hood
- Alert people in the immediate area of the spill
- Notify SMIF immediately by calling emergency numbers posted near the phone
- Wait for instructions from SMIF or for SMIF personnel to arrive to complete the clean-up of the affected area.

Spills Outside of a Chemical Hood

- Attend to injured or contaminated persons and remove them from exposure
- Press the closest manual alarm button (blue box) and evacuate the lab
- Make yourself available to the SMIF staff and/or emergency responders and be prepared to tell the following: What chemical(s) are involved, how much was spilled, where the spill is located, nature of any injuries

10. **Training of personnel:**

- All personnel are required to complete the SMIF General Lab Safety session and the SMIF Chemical Safety and Wet Hood training session.
- All personnel shall read and fully adhere to the ***Wet Hood Operating Procedure*** and the ***SMIF Lab Safety and Procedures Manual***