Particularly Hazardous Substances (PHS)

Standard Operating Procedure (SOP)

Formaldehyde, formalin, paraformaldehyde solutions, and paraformaldehyde solids

Principal Investigator:_____ Room & Building #:_____

Department:_____ Phone #_____

Date:_____

Location(s) Covered by this SOP.

Building	Lab #
_____	_____
_____	_____

Note: This SOP must be customized for each lab using formalin solution, paraformaldehyde solution, or paraformaldehyde solids. Insert a copy (either hard or electronic) into your chemical hygiene plan.

Note: This SOP must be reviewed on an annual basis or whenever changes are made to use and/or location.

USE & PROCEDURE

Use this section to describe the process or circumstances of use, including the chemical name (IUPAC), common name, CAS #, concentration and quantity. Attach experimental protocol or written lab specific procedures.

GENERAL INFORMATION

- All formaldehyde, formalin, paraformaldehyde work must be conducted in a properly operating chemical fume hood.
- Any work conducted outside of a fume hood must be approved by the PI and the PI must contact EHRS and request air monitoring for formaldehyde. Air monitoring must be conducted prior to using outside a fume hood and is required to determine if there is a potential health hazard and to ensure compliance with the Occupational Safety and

Health Administrations (OSHA) Formaldehyde Standard (29 CFR 1910.1048).
  - OSHA Action Level- 0.5 ppm formaldehyde as an 8-hour time weighted average
  - OSHA Permissible Exposure Limit (PEL)- 0.75 ppm formaldehyde as an 8-hour time weighted average
  - OSHA Short-Term Exposure Limit (STEL)- 2 ppm formaldehyde over a 15-minute time interval
- All workers must meet the training requirements listed in the training section of this SOP prior to using any formaldehyde, formalin or paraformaldehyde.
- Refer to the EHRS Handbook-5.8-Formaldehyde Safety for additional information

POTENTIAL HAZARDS

- Formalin and paraformaldehyde solutions can emit formaldehyde gas, a known carcinogen, and can irritate the eyes and skin.
- Working with paraformaldehyde powder can expose employees to paraformaldehyde dust, which is a strong irritant/sensitizer.
- Contact with these solutions or paraformaldehyde solids may cause drying of the skin and/or allergic dermatitis.
- Consult your Material Safety Data Sheet (MSDS) for additional information.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The level of skin and eye protection should be selected based on the potential for splashing and other forms of exposure.

- Minimum potential for splash & exposure:
  - Single pair of chemical resistant gloves (Change gloves frequently and immediately replace with new gloves when gloves become contaminated.
    - Nitrile
    - Neoprene
    - PVC (vinyl)
    - Butyl
    - Viton
  - Protective Clothing
    - Non-porous lab coat
    - Impervious sleeves
    - Closed-toed impervious shoes
  - Safety Glasses with side shields or Chemical Splash Goggles-Must meet ANSI/OSHA specifications.

- When using or transferring large quantities or when using in systems under pressure.
  - Chemical Splash goggles-Must meet ANSI/OSHA specifications.
  - Face shield (if not working in a fume hood or if hood's sash is not in the down position
  - Double pair of chemical resistant gloves (Immediately replace with new gloves when gloves become contaminated.
    - Nitrile

        - Neoprene
        - PVC (vinyl)
        - Butyl
        - Viton
    - Chemical resistant apron/smock/lab coat
    - Protective Clothing
        - Impervious sleeves
        - Closed-toed impervious shoes

NOTE: Latex gloves are not recommended.
NOTE: Avoid using the traditional cotton-polyester white lab coat which readily collects/absorbs compounds.
NOTE: Personnel using respirators must be enrolled in the University's Respiratory Protection Program.

INSERT ADDITIONAL PPE AS NECESSARY:

ENGINEERING CONTROLS

- All operations involving formaldehyde, formalin and/or paraformaldehyde (powder, granules, and flakes) must be conducted in a properly operating and certified chemical fume hood or ducted Biological Safety Cabinet.
- Dilute (<4% formaldehyde) and small volumes may be used outside of a fumehood as long as the process has been monitored by EHRS and formaldehyde levels are determined to be at acceptable safe levels.
- Safety Shower and Emergency eyewash should be easily accessible within the immediate work environment in areas where formaldehyde is used.
    - Emergency Eyewash is mandatory in areas where an employee's eyes may be splashed with solutions containing formaldehyde that are $\geq$ 0.1 percent.
    - Safety Shower is mandatory in areas where employee's skin may be splashed (example-due to equipment failure or improper work practices) with solutions containing formaldehyde that are $\geq$ 1 percent.
- Laboratory rooms must be at negative pressure with respect to the corridors and external environment.
- Laboratory/Room doors must be kept closed at all times.

INSERT ADDITIONAL ENGINERING CONTROL AS NECESSARY:

SPECIAL HANDLING PROCEDURES & STORAGE REQUIREMENTS

- Laboratory-specific written procedures are required for formalin, formaldehyde and paraformaldehyde. Attach procedures to SOP.
- Keep container closed at all times.
- Store in secondary containment with other flammables in a cool, dry, well ventilated area away from incompatible materials (oxidizing agents, reducing agents, strong acids or bases, alkalis, alkali metals, amines, ammonia or phenol.
- Use the smallest practical quantities for the experiment being performed.
- Transport formaldehyde solutions in secondary containment, preferably a polyethylene or other non-reactive acid/solvent bottle carrier.
- Keep containers of paraformaldehyde away from water.
- Do not sore on the floor and keep away from ignition sources.
- Only approved explosion-proof refrigerators can be used for the cold storage of formaldehyde or paraformaldehyde.
- All areas which use formaldehyde must have a formaldehyde spill kit present.

INSERT ADDITONAL HANDLING & STORAGE REQUIREMENTS AS NECESSARY:

TRAINING REQUIREMENTS

- All personnel are required to complete the EHRS new employee safety training prior to working with any material.
- All personnel must take the EHRS formaldehyde safety training class prior to working with any material covered by this SOP and at least annual thereafter.

- The Principal Investigator (PI) must provide lab specific training to all laboratory workers specific to the hazards (physical and health) involved in working with the substance, work area decontamination and emergency procedures. In addition, the PI must review and provide a copy of the MSDS and this SOP to any lab worker prior to working with any of the materials covered by this SOP.
- The PI must ensure that all lab personnel have attended the required training and/or refresher training.

DESIGNATED AREAS

- Designated area(s) for use and storage of formaldehyde, formalin, paraformaldehyde must be established. This may be specific work benches or chemical fume hoods.
- All chemicals must be in secondary containment with proper signage.
- Signage is required for the container, designated work area and storage locations. Sign wording must state the following. "DANGER, CANCER HAZARD". Special signage may be required if any air monitoring results exceed unsafe levels. Refer to EHRS handbook-5.8-Formaldehyde Safety for additional information.
- Access to the designated areas shall be limited to trained and knowledgeable personnel.

INSERT LOCATION OF DESIGNATED AREA(S):

SPILL PROCEDURES

- Spills-General Instructions
  - Notify others of the spill and keep spill area confined.
  - Review MSDS
  - Don appropriate PPE (double nitrile gloves, splash goggles, face shield and lab coat
  - Extinguish all ignition sources
  - Collect all spilled material and clean up material and place into an appropriate waste container or double lined bag. Label the bag/container with a Hazardous waste label.
  - Call EHRS at 215-707-2520 and report the spill.
- Minor Spills-Liquid
  - Neutralize and/or absorb freestanding liquid with spill kit absorbent, inert material (vermiculite, sand, sand. etc.) or absorbent pads.
  - Place clean up items in waste container or double lined bag.
  - Wait 10 minutes and wash spill area with soap and water
- Minor Spills-Solid
  - Wet paper towels or absorbent pads and gently place on top of the powder to avoid creation of dust.
  - Carefully wipe up the area and place clean up material into an appropriate waste container or double lined bag. Label the bag/container with contents.
  - Wait 10 minutes and wash spill area with soap and water

- Major Spills-Liquid & Solid
  - Evacuate room or immediate area
  - Call EHRS at 215-707-2520
  - Post signs at entrances/exits notifying others of spill.
  - Provide assistance and information to spill responders.

INSERT LOCATION OF FORMALDEHYDE SPILL KIT:

FIRST AID/ EXPOSURES

- General Instructions
  - Obtain MSDS
  - Contact Campus Police at 1-1234 if immediate medical assistance is necessary.
  - Notify Supervisor
  - Notify EHRS at 215-707-2520
- Seek medical assistance after any accidental exposure.

INSERT LOCATION OF NEAREST STUDENT HEALTH, EMPLOYEE HEALTH AND HOSPITAL

- Inhalation
  - Remove to fresh air
  - Seek medical attention
- Skin/Body Contact
  - Remove clothing and rinse body in emergency shower for at least 15 minutes
  - Seek medical attention
- Eye Contact
  - Immediately rinse eyeball and inner surface of eyelid for at least 15 minutes
- Ingestion
  - Seek immediate medical attention

DECONTAMINATION PROCEDURES
• Wash all work areas, lab benches ,equipment (glove boxes, hoods) and glassware with soap and water

WASTE DISPOSAL
• All formaldehyde, formalin and paraformaldehyde solutions and powders must be disposed of through EHRS.

PRINCIPAL INVESTIGATOR CERTIFCATION
I certify that I have read and understand the requirements of this Standard Operating Procedure (SOP) and that I agree to fully adhere to its requirements. Principal Investigator Name:_____ Title:_____ Signature:_____ Date:_____