# Standard Operating Procedure

**Chemical name and concentration:** Click here to enter text.

*This is an SOP template. It is not complete until:*

1. *Lab specific information is entered into the box below.*
2. *Lab specific protocol and procedure is added to the protocol and procedure section.*
3. *SOP has been signed and dated by the PI and relevant lab personnel.*
4. *All italicized/red text has been removed/replaced with information specific to the chemical.*

Print a copy and insert into your **Laboratory Safety Manual and Chemical Hygiene Plan**. Refer to instructions for assistance.

|  |  |  |  |
| --- | --- | --- | --- |
| **School and department:** | Click here to enter text. | | |
| **SOP preparation date:** | Click here to enter a date. | **SOP approval date:** | Click here to enter a date. |
| **Principal investigator:** | Click here to enter text. | | |
| **Lab manager name:** | Click here to enter text. | | |
| **Laboratory phone:** | Click here to enter text. | **Office phone:** | Click here to enter text. |
| **Emergency contact:** | Click here to enter text. | **Contact phone:** | Click here to enter text. |
|  |  |  |  |
| **Laboratory locations covered by this SOP – building and room number** | | | |
| Click here to enter text. | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Type of SOP** |  | Process |  | Hazardous chemical |  | Hazardous class |

# Hazards Identification

## **GHS Classification**

*Copy chemical-specific information from the SDS section 2.*

## **GHS Label Information**

*Copy chemical-specific information from the SDS section 2.*

### **Pictogram**

*Select as needed from the following:*

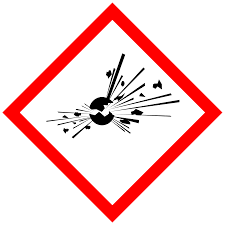
****Icon

Description automatically generatedLogo, icon

Description automatically generatedIcon

Description automatically generatedA picture containing text, sign, vector graphics

Description automatically generatedA picture containing text, clipart

Description automatically generated

### **Signal Word**

### **Hazard Statement(s)**

*Copy chemical-specific information from the SDS section 2.*

### **Precautionary Statement(s)**

*Some of these statements belong under “First Aid Procedures” below. Place them according to relevance (i.e., put “If on skin” instructions below “In case of skin contact.”*

# Physical and Chemical Properties

*Get these from the SDS sections 1 & 9.*

|  |  |  |  |
| --- | --- | --- | --- |
| CAS | Click here to enter text. | Melting Point/Range | Click here to enter text. |
| Molecular Formula | Click here to enter text. | Boiling Point/Range | Click here to enter text. |
| Molecular Weight |  | Flash Point |  |
| Physical State, Color | Click here to enter text. | Upper flammability/ explosion limit | Click here to enter text. |
| Odor | Click here to enter text. | Lower flammability/ explosion limit | Click here to enter text. |
| Odor Threshold | Click here to enter text. | Autoignition Temp. | Click here to enter text. |
| Evaporation Rate | Click here to enter text. | Decomposition Temp | Click here to enter text. |

# First Aid Procedures

*Get chemical-specific info from the SDS sections 2 and 4.*

**If inhaled,** move to fresh air. If the person is not breathing, give artificial respiration. Avoid mouth to mouth contact. Call 911. Then call EHS at 480-965-1823.

**In case of skin contact,** immediately remove all contaminated clothing and flush affected area for 15 minutes. Call 911. Then call EHS at 480-965-1823.

**In case of eye contact,** use nearest emergency eyewash immediately. Remove any contact lenses. Call 911. Then call EHS at 480-965-1823.

**If swallowed,** do not induce vomiting. Never give anything by mouth to an unconscious person. Call 911. Then call EHS at 480-965-1823.

*Preceding information may change based on specific guidance for the hazardous material.*

# Spill and Accident Procedure

## **Personal precautions**

* Avoid breathing vapors, mist or dust.
* If the spill happened outside of a fume hood and poses a respiratory threat, evacuate the lab and call EHS (480-965-1823).
* Do not attempt clean-up without the required PPE (see below).

## **Environmental precautions**

Prevent further leakage or spillage – if safe to do so. Do not allow product to enter drains.

## **Methods and materials for containment and clean-up**

* Consider material compatibility prior to clean-up. Verify the spill is not releasing hazardous fumes outside of a fume hood. Verify spill kit is available. Verify correct PPE is being worn.
* Immediately assess amount spilled, follow posted ASU Emergency Response Guide procedures for hazardous materials incidents.
* If a chemical exposure has occurred, follow First Aid Procedures above. A fellow lab worker shall call 9-1-1 and seek immediate medical attention. Then call EHS at (480) 965-1823.
* Secure / restrict access to the area of the spill to prevent spread of the chemical.
* Use the available spill kit to stop and contain the spill. Bag the collected material.
* Label and tag as hazardous waste and submit a pick-up request to EH&S using EHS Assistant. <https://ehsaweb.asu.edu/>

*Preceding information may change based on specific guidance for the hazardous material.*

# Personal protective equipment (PPE) & Engineering Controls

## **Respiratory protection**

*Guidance:*

*Fume hoods should be used for any chemical that is hazardous by inhalation, at any point in the process where the material can aerosolize.*

* *If it is hazardous by inhalation and volatile, a fume hood must be used from the moment the container is opened until the moment when the chemical has been sealed away in containers again (or reacted into a non-volatile material).*
* *If the chemical is not volatile but can create hazardous dusts, a fume hood must be used during any dust-generating (i.e. pouring/stirring) step.*
  + *If the chemical will be generating* combustible *dusts, please contact FSE Safety for further guidance.*
* *If the chemical could be corrosive to the fume hood’s ducts and fan blower, and is being aerosolized by methods in use (i.e. boiling or spraying), contact FSE Safety for further guidance.*
* *A snorkel may be substituted for a fume hood only if* all *of the following are true:*
  + *the chemical does not present unusual inhalation hazards (for example, isopropanol)*
  + *operation will take place with small amounts (<5 mL)*
  + *the operation will take place in a small area (about 1 sq. ft. of benchtop space with the snorkel no further than 8 in. above the work)*
* *A respirator cannot be substituted for a fume hood. Respirators also have special requirements, and the cartridges must be matched to the chemical. Consult FSE Safety if you believe you may need a respirator.*

*Follow any pandemic respiratory protection requirements that are in place at the time of the decontamination process.*

## **Hand protection**

*Specify the type of gloves along with their thickness. Glove type may be indicated in the SDS section 8. Check with glove manufacturer and independent testing charts to ensure that the gloves you plan on using are compatible with your chemical(s).*

*Here are a few manufacturer testing charts:*

<https://cdn.mscdirect.com/global/media/pdf/search/ansell/ansell-chemical-glove-resistance-guide.pdf>

*Keep in mind that permeation time is dependent on material (nitrile vs. others) and thickness (disposable 4 mil vs. heavy-duty 11 or 20+ mil).*

*Consult FSE Safety if your chemical/concentration is not listed on the charts, or if you’re considering using disposable nitriles when the charts only tested heavy-duty nitriles, or if there is any uncertainty about the type of glove needed.*

## **Eye protection**

* Wear chemical splash goggles to protect from splash hazards and chemical vapors.
  + Chemical splash goggles must meet ANSI Z87.1 D3 certification. Goggles must be properly-fitted to the face to provide an adequate seal against splashes.
* Goggles must be worn at all times by all lab personnel within splash range of the work performed if the work involves any liquids that are not plain water.

*If light/radiation is produced, consult FSE Safety for further guidance.*

## **Skin and body protection**

* Lab coat
  + *An FR-rated lab coat (usually Nomex or fire-retardant-treated cotton) is* required *for work with pyrophorics. FR-rated lab coats are strongly recommended for work with flammable chemicals.*
  + *Lab Coats must be worn at all times by all lab personnel who are within splash range of the work performed* ***if*** *the work involves anything that is hazardous by skin contact*
  + *Do not wear a lab coat or other loose-fitting clothing near machine shop tools/equipment – consult FSE Safety with any questions/concerns*
* Full-length pants
* Fully-enclosed rubber or leather shoes

*Preceding information may change based on specific guidance for the hazardous material.*

## **Hygiene measures**

Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product.

*Preceding information may change based on specific guidance for the hazardous material.*

# Storage

*Get these from the SDS sections 7 and 10.*

* Ensure the container is tightly closed at all times with a lid that will not come loose in the event that the container tips over (parafilm is not a substitute).
* *List any chemical compatibilities (i.e., do not store with oxidizers) here – see SDS sections 7 & 10*
* *If the material is capable of building up gas inside the container, include a protocol for vented caps or periodic opening of the bottle. Consult FSE Safety for details.*

# Handling Requirements

*Get these from the SDS section 7, and add any additional precautions recommended by your PI, Lab Manager, or Safety Staff (recommendations may be based on the SDS sections 2, 10, & 11).*

* The lab where the material is being handled must have an approved / certified emergency eyewash and safety shower. *Consult FSE Safety if your lab is missing either the shower or the eyewash.*
* Ensure you are wearing the required PPE and using appropriate engineering controls as stated above.
* Lab emergency contact information must be readily posted. Easy access to a cellular phone or land line is readily available.
* *Specify any additional handling concerns (i.e. no metal tools, no ground-glass joints in the glassware, special plastic vs. glass vessels, etc.)*

*Preceding information may change based on specific guidance for the hazardous material.*

# Protocol and procedure

## ***Laboratory-specific procedures***

*Add your lab’s specific procedures in this section. Write out separate steps in a list format for easy reading. Please include photos whenever possible. Be descriptive – future generations of researchers in your lab may need to learn the procedure from this document.*

Click here to enter text.

**Important note:** Any deviation from this SOP requires advance PI approval.

# Cleanup and Waste Disposal Procedure

## **Label waste**

* Attach a completed ASU Hazardous Waste tag to all waste containers as soon as the first drop of waste is added to the container.

## **Store waste**

* Store hazardous waste in closed containers, in secondary containment and in a designated location.
  + Do not store waste inside a fume hood. Clutter inside a fume hood will block the air flow and prevent the fume hood from working properly.
* Separate waste from any incompatible materials.
* Double-bag dry waste (kimwipes, gloves, etc.) using sealable transparent bags.
* Any waste objects that can penetrate bags (pipettes, swabs, razor blades, or syringes) must be placed inside a leak-proof container made out of a material that will resist cuts or punctures from those objects.
* If the chemical gives off hazardous vapors, the waste container must be brought inside the fume hood whenever waste is being added to it.
* Waste must be under the control of the person generating and disposing of it.

## **Dispose of waste**

* Dispose of regularly generated chemical waste within 90 days or less (even if the container is not full).
* Use EHS Assistant online hazardous waste pick-up request system: <https://ehsaweb.asu.edu/>
* Contact ASU EH&S at (480) 965-1823 with questions.

*Preceding information may change based on specific guidance for the hazardous material.*

# Documentation of training

* Prior to conducting any work with this material, Principal Investigator or designee must provide to his or her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the Safety Data Sheet or SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate/required laboratory safety training or refresher training within the last one year.

**I have read and understand the content of this SOP.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Employee name** | **ASU affiliate no.** | **Signature** | **Date** |
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