Research
Research Laboratory & Safety Services

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# Inhalation Hazard
# Hazard Class Standard Operating Procedure

## 1. Purpose

This standard operating procedure (SOP) is intended to provide guidance on how to safely work with chemicals that present an inhalation hazard in a University of Arizona (UA) laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before using chemicals that present an inhalation hazard. If you have questions concerning the requirements within this SOP, contact the Approval Holder (AH)/Approval Safety Coordinator (ASC), or the Research Laboratory & Safety Services (RLSS).

## 2. Scope

This hazard class SOP only addresses safety issues specific to the inhalation hazard of a chemical; several hazard class SOPs may be applicable for a specific chemical.

## 3. Hazard Description

This hazard class includes chemicals that may be hazardous to a laboratory worker via inhalation. While this class ranges from chemicals that are irritating, harmful, toxic and fatal to laboratory workers, the mode of entry for this class is the same: inhalation. This classification allows for the determination of hazard controls required to protect laboratory workers from inhalation hazards. This hazard class also includes chemicals that cause, or may cause, damage to organs after inhalation.

Chemicals that are fatal to laboratory workers if inhaled are considered to be particularly hazardous chemicals by OSHA. However, it is important to note that not every chemical under this hazard class is a particularly hazardous chemical.

## 4. General Control of Hazards

The following general control measures should be implemented whenever using or handling chemicals which pose an inhalation hazard:

- Plan experiments involving inhalation hazards carefully, including consulting the SDS(s). Do not handle chemicals that present inhalation hazards until all safety precautions have been read and understood.
- Minimize the quantity and/or concentration of these chemicals used or synthesized to the smallest amount immediately needed for an experiment.
- Do not breathe dust, fumes, gas, mist, vapors or sprays when handling these chemicals.
- Use and store only in well-ventilated areas.
- Keep containers tightly closed and sealed.

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## 5. Engineering Controls

A certified chemical fume hood must be used when handling chemicals that present an inhalation hazard, especially those that are toxic or fatal if inhaled. In some cases, other local ventilation or containment devices may be used to adequately control the inhalation hazard (i.e. glove box/glove bag, snorkel, gas cabinet, etc). The use of a chemical monitor/alarm may be required for chemicals that present an inhalation hazard (e.g. ammonia gas, carbon dioxide gas, etc.). For additional information on engineering control options, contact the RLSS or your AH/ASC.

## 6. Personal Protective Equipment

At a minimum, all laboratory workers must wear safety glasses, long pants, closed-toed shoes, a laboratory coat and examination gloves when working with hazardous chemicals in a laboratory.

If chemicals that present an inhalation hazard cannot be used in a ventilated enclosure (i.e. chemical fume hood) due to experimental restrictions, laboratory workers should consider the use of a respirator. This is especially true for chemicals that are toxic or fatal if inhaled. Contact the RLSS to perform a hazard assessment of your experimental procedures to determine if respiratory protection should be used. An RLSS hazard assessment report is required prior to registration into the Respiratory Protection Program, facilitated by Risk Management Services.

## 7. Handling and Storage Requirements

When working with highly toxic chemicals, or poisons, prevention of accidental release becomes even more important than usual. Chemicals that are fatal if they are inhaled should be securely stored; access to these chemicals should be restricted.

Segregate chemicals that are fatal or toxic if inhaled from non-toxic materials. Ideally, this segregation would occur via separate cabinets. If space is limited, however, storing chemicals that are fatal or toxic in secondary containment (i.e. plastic trays or Tupperware) within the same cabinet as other chemicals is acceptable.

Particularly hazardous chemicals (i.e. those that are fatal upon inhalation) must be stored and used within a labelled designated area. If you are unsure if a chemical constitutes a particularly hazardous chemical, be conservative and treat them as if they are.

Carefully plan the transportation of chemicals that are fatal or toxic if inhaled. Handling chemicals outside of the laboratory area should be minimized, but when necessary, wear full personal protective equipment and carry the chemicals in unbreakable secondary containment.

## 8. Waste Disposal

Waste chemicals that present an inhalation hazard should be collected in compatible waste containers (i.e. plastic 3.5 gallon buckets) and segregated from incompatible chemicals. Some particularly hazardous chemicals may require special decontamination and disposal procedures. Contact Risk Management Services for further information on the disposal of chemicals.

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## 9. Spill and Incident Procedures

Laboratory personnel may clean a small spill of chemicals that present an inhalation hazard themselves, as long as they wear appropriate personal protective equipment and have appropriate training. If the spill is large, occurs with a chemical that is fatal if inhaled, requires a respirator for cleanup, or occurs in a public area, do not attempt to clean the spill yourself. Evacuate the area and follow the procedures in the University Chemical Hygiene Plan section on major chemical spills. Inform the RLSS of all major chemical spills.

If a laboratory worker is injured or exposed to a chemical that is toxic or fatal by inhalation, immediately notify the AH/ASC; call 911 if the laboratory worker needs immediate medical attention. Move the laboratory worker to fresh air. If the exposed laboratory worker is experiencing extreme pain or difficulty breathing, they should get immediate medical attention. If the exposure is less severe, and the laboratory worker is feeling ill or if there is persistent respiratory burning, he/she should call the Arizona Poison & Drug Information Center at 626-6016 for information to determine if further medical action is required. Inform the RLSS and Risk Management Services of the incident as soon as practicable.

If a fellow laboratory worker's breathing has stopped after exposure to a chemical that is toxic or fatal after inhalation, and you have been trained in cardiopulmonary resuscitation (CPR), perform artificial respiration as you wait for the emergency response team. Consult the chemical's SDS for more specific information on appropriate first aid.

## 10. Designated Area

Chemicals that are fatal upon inhalation are considered to be particularly hazardous chemicals. Because of this, some chemicals in this hazard class will require the designation of an area for their use and storage. All laboratory workers must know the location of these designated areas, and must use or store particularly hazardous chemicals only within them. Designated areas also require posting with the "Designated Area Label," which can be found on the RLSS website.