

Standard Operating Procedure



CARCINOGENS

This standard operating procedure (SOP) is intended to provide general guidance on how to safely work with carcinogenic materials. This SOP is generic in nature and only addresses safety issues specific to carcinogens. In some instances, several general use SOPs may be applicable for a specific chemical. In addition, programs exist for some carcinogens; those chemicals are denoted with an asterisk () in the list below.*

A chemical is considered a carcinogen if identified as such by any of the following:

- National Toxicology Program, Annual Report on Carcinogens (latest edition) – listed under the category of “known to be carcinogens”
- International Agency for Research on Cancer, Monographs (latest edition) – listed as Group 1
- International Agency for Research on Cancer, Monographs (latest edition) – Group 2A or Group 2B reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:
 - After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m³;
 - After repeated skin application of less than 300 mg/kg of body weight per week; or
 - After oral dosages of less than 50 mg/kg of body weight per day.
- Regulated by OSHA as a carcinogen under 29 CFR 1910 Subpart Z, Toxic and Hazardous Substances
- GHS Category 1 “Known or Presumed Carcinogen” (includes Category 1A & 1B)

Examples of known human carcinogens include:

- Arsenic/Inorganic arsenic compounds
- Asbestos
- Benzene
- Beryllium/Beryllium compounds
- Bis(chloromethyl) Ether
- Cadmium/Cadmium compounds
- Ethylene Oxide*
- Formaldehyde*
- Vinyl Chloride

Potential Hazards/Toxicity

Carcinogenic compounds can initiate or increase the proliferation of malignant neoplastic cells or the development of malignant or potentially malignant tumors. They are chronic toxins with long latency periods that can cause damage after repeated or long duration exposures and often do not have immediate apparent harmful effects. Users can be exposed to these compounds through inhalation, ingestion, and/or dermal absorption. Dermal absorption may cause the same toxic effects as inhalation or ingestion.

Users must familiarize themselves with the specific hazards of the compounds they are working with, which can be found on the chemical’s Safety Data Sheet (SDS). SDSs are available through the Safety Data Sheet link on Yale’s EHS webpage (ehs.yale.edu).

Personal Protective Equipment (PPE)

The University's Personal Protective Equipment Policy can be found on the EHS website (ehs.yale.edu)

Eye Protection

Safety glasses must be worn whenever handling carcinogenic chemicals. When there is the potential for splashes, goggles must be worn.

Hand Protection

Gloves must be worn when handling carcinogenic chemicals. Exam style nitrile gloves (minimum 4mil thickness) should be adequate for handling small quantities of most of these in general laboratory settings. However, if skin contact is likely or large amounts are being used, then a utility grade glove should be worn over the exam style nitrile. To ensure that the appropriate utility grade glove is selected, refer to the chemical's SDS, use a glove manufacturer's selection guide or contact EHS.

Skin and Body Protection

Long pants or clothing that covers the body to the ankles and closed-toe solid top shoes must be worn when these compounds. Lab coats must be worn. If skin contact is likely, then additional protective clothing (i.e., apron, oversleeves) is required.

Engineering Controls

Fume Hood

Fume hoods, or other locally exhausted ventilation, must be used when handling these substances. This includes during transfers or manipulations of small amounts which may generate aerosols (i.e., pipetting) and during the weighing of solids.

Storage/Handling

- Demarcate an area where work may be conducted with carcinogens. A designated area may be an entire laboratory, a defined area within the laboratory, or a device such as a laboratory hood. Designated areas must be clearly marked with signs that identify the chemical hazard and include an appropriate warning; for example: WARNING! BENZENE WORK AREA – CARCINOGEN. The carcinogen pictogram on the laboratory door sign also identifies the laboratory as a designated area.
 - Upon leaving the designated area, remove any personal protective equipment worn and wash hands with soap and water.
 - After each use (or day), wipe down the immediate work area and equipment to prevent accumulation of chemical residue.
 - At the end of each project, thoroughly decontaminate the designated area before resuming normal laboratory work in the area.
- Store in approved locations, such as chemical cabinets. Carcinogens which are also flammable should be stored in flammable rated cabinets. Do not store liquids above eye level (~5 feet) or on benches.
- Keep segregated from incompatible chemicals.

Waste Disposal

Carcinogens must be collected as hazardous waste. Items which have come into contact with the carcinogens, such as weigh boats, kimwipes, pipettes, and gloves, but which only have trace amounts on them, can be disposed of in the normal trash. This does not include items contaminated with carcinogens which are P listed/acutely toxic, i.e., arsenic compounds. All items contaminated with acutely toxic compounds must be collected as hazardous waste.

Emergency Procedures

Fire Extinguishers

Both ABC dry powder and carbon dioxide extinguishers are appropriate for most fires involving carcinogens.

Eyewash/Safety Showers

An ANSI approved eyewash station that can provide quick drenching or flushing of the eyes must be immediately available within 10 seconds travel time for emergency use. An ANSI approved safety drench shower must also be available within 10 seconds travel time from where these compounds are used. Ensure the locations of the eyewashes and safety showers, and how to activate them, are known prior to an emergency.

First Aid Procedures

If inhaled

Remove to fresh air. Follow up with Acute Care or Employee Health as appropriate (203-432-0123).

In case of skin contact

Go to the nearest emergency shower if contaminated. Yell for assistance and rinse for 15 minutes, removing all articles of clothing to ensure contaminate is completely removed. Follow up at Acute Care/Employee Health as appropriate (203-432-0123).

In case of eye contact

Go to the nearest emergency eyewash. Yell for assistance and rinse for 15 minutes. Follow up at Acute Care/Employee Health (203-432-0123).

Spills

Small Spill

If a small spill occurs inside a fume hood or near other local exhaust ventilation, lab personnel should be able to safely clean it up by following standard spill clean up procedures:

- Alert people in immediate area of spill
- Increase ventilation in area of spill (open fume hood sashes)
- Wear personal protective equipment, including utility grade gloves
- Confine spill to small area with adsorbent material (pads, vermiculite)
- Collect residue, place in container, label container, and dispose of as hazardous waste
- Clean spill area with soap and water

Larger Spill

- Call EHS for emergency assistance (203-785-3555)
- Evacuate the spill area
- Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering
- Stay nearby until emergency personnel arrive and provide them with information on the chemicals involved