



## **GUIDELINES FOR USE OF PARTICULARLY HAZARDOUS SUBSTANCES**

The OSHA Lab Safety Standard ([29 CFR 1910.1450](#)) specifically mandates that labs develop Standard Operating Procedures ([SOPs](#)) for handling “Particularly Hazardous Substances”, which they (OSHA) define as Select Carcinogens, Reproductive Toxins, and Acute Toxins. If you are unsure if a chemical falls into one of these categories, check the Safety data sheet (SDS) and the container label. Contact Environmental Health and Safety at x3227, if you have questions about the chemicals you intend use.

- I. Select Carcinogens:** Carcinogens listed by OSHA, the International Agency for Research on Cancer (IARC), and the National Toxicology Program (NTP) as known or suspected human carcinogens. Consult the following websites for complete information:
  - a. [OSHA](#): Carcinogens are agents that can cause cancer. In industry, there are many potential exposures to carcinogens. Generally, workplace exposures are considered to be at higher levels than for public exposures. SDSs should always contain an indication of carcinogenic potential.
    - i. [OSHA List](#) of select carcinogens
  - b. [NTP](#): Annual Report on human carcinogens. The Report on Carcinogens (RoC) is a congressionally mandated, science-based, public health report that identifies agents, substances, mixtures, or exposures (collectively called "substances") in our environment that pose a hazard to people residing in the United States.
    - i. [NTP LIST](#) of chemical carcinogens.
  - c. [IARC Monographs](#): on the evaluation of carcinogenic risks to humans.
    - i. [IARC LIST](#) of chemical carcinogens.
  
- II. Reproductive Toxins:** Chemicals that may adversely affect male and female reproductive health and the developing fetus.
  - a. [OSHA](#): Exposure to reproductive hazards in the workplace is an increasing health concern. Reproductive hazards are substances or agents that may affect the reproductive health of women or men or the ability of couples to have healthy children. These hazards may cause problems such as infertility, miscarriage, and birth defects.
  
- III. Acutely Hazardous Materials:** Substances with a high degree of acute toxicity are those that can cause death, disability, or serious injury after a single, relatively low-level exposure. Pharmaceuticals and biological substances can also present Highly Acute Hazards. Find the LD50 and LC50 on a SDS or in the [Registry of Toxic Effects of Chemical Substances](#) (RTECS).
  - a. LD50- The amount of a chemical that when ingested, injected, or applied to the skin of a test animal under controlled laboratory conditions will kill one-half (50%) of the animals.

- b. LC50- The concentration of the chemical in air that will kill 50% of the test animals exposed to it.

**IV.** Review the lists in sections I, II, and III to determine if the chemical is a Particularly Hazardous Substances (PHS). If the chemical is a PHS the general procedures must be followed:

- a. Principle Investigator, Faculty, and Staff should review use of material, experiment design and safety precautions before ordering and beginning experiment.
- b. Write a SOP for use of the PHS. Review the [Completing a Risk Assessment and Writing Standard Operating Procedures](#) document.
  - i. A written SOP is required for use of a PHS.
- c. Include hazard, PPE, and emergency information in the experimental procedure document.
- d. Keep an appropriate spill kit on hand. Establish emergency procedures for the PHS in use. Utilize secondary containment of PHS if necessary.
- e. Maintain a [current chemical inventory](#) of the “particularly hazardous substances” used in your laboratory.
- f. Order and use the smallest quantity of material required for the experiment.
- g. Maintain a readily available Safety Data Sheets (SDS).
- h. Provide site-specific [training](#) in the use of these substances and maintain training documentation.
- i. Assign and post designated PHS work areas. A designated work area can be an entire lab, a section of a lab, fume hood and or any PHS dedicated equipment. **The identity of the hazardous substance in use must be on the sign for the area.**
  - i. See Appendix A.
    - 1. This sign must be posted in areas where the PHS is used.
    - 2. Spell out the chemical name on the sign. No abbreviations.
- j. If necessary, restrict access to the laboratory during use of the PHS.
- k. Designated work areas should be kept clean and decontaminated at regular intervals. Decontamination procedures are determined by the type of chemical, amount of use, location of use and other factors.
- l. Avoid inhalation of PHS. Prevent skin contact. Use appropriate personal protective equipment (PPE) such as chemical resistant gloves, safety glasses or goggles and protective clothing as necessary. Review the PPE SOP and the TTU Chemical Hygiene Plan.
- m. Respiratory protection may be necessary when materials are handled outside chemical fume hoods or glove boxes and exposure limits may be exceeded. **Call EHS if respiratory protection is needed at x3227.**
- n. Store PHS in a secure area.
- o. If PHS is a highly toxic gas, the cylinder should be enclosed in a gas cabinet featuring:
  - i. Self-closing limited access ports or fire-rated windows
  - ii. Self-closing doors

- iii. Negative pressurization inside the cabinet relative to the lab
- iv. Access ports face velocities greater than 200 fpm
- v. 12-gauge steel construction
- vi. Treatment system connected to exhaust
- vii. Continuous gas monitoring system for highly toxic gases

**V. References:**

OSHA Lab Safety Standard ([29 CFR 1910.1450](#))

OSHA Hazard Communication Standard ([29 CFR 1910.1200](#))

[Indiana State University- Use of Particularly Hazardous Substances](#)

[University of California Santa Barbara- Chemical Hazards](#)

**DANGER**  
**DESIGNATED AREA**

for select carcinogens, reproductive toxins,  
and high acute toxicity chemicals.

**AUTHORIZED PERSONNEL ONLY**

**Chemical:** \_\_\_\_\_