

**LOCAL JOINT HEALTH AND SAFETY COMMITTEE
DEPARTMENT OF BIOMEDICAL SCIENCES
STANDARD OPERATING PROCEDURE**

HANDLING AND WEIGHING HAZARDOUS CHEMICALS

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Purpose: To promote the safe handling of hazardous substances including carcinogens, mutagens, teratogens and highly toxic compounds.

Approvals Required: Faculty Supervisor, Local JHSC, EHS

1. DEFINITIONS:

Hazardous chemicals: drugs, chemicals, natural and synthetic products which present a significant, immediate or long term health risk to persons or their offspring exposed to them.

Tared Weight: the difference between gross weight and the net weight i.e. weight of container and contents minus weight of contents.

2. REQUIREMENTS:

All persons shall have **Workplace Hazardous Materials Information System (WHMIS)** training and complete departmental safety orientation before handling any chemical with hazardous potential. Everyone **must** read the **Material Safety Data Sheet (MSDS)** before handling chemicals in the categories listed above!!!

3. TASK:

Preparation:

- a) Read and understand the MSDS for the compound you plan to use.
- b) Wear a properly fastened lab coat, protective gloves and **perform all work in a non-cluttered fume hood with plastic backed benchcoat covering the work area!**
- c) **CAUTION: Never open containers containing hazardous substances outside of the fumehood.** Transport the compound to the work area inside the fume hood in a doubly closed container system. For example, if the compound is in a glass container, place the glass container inside a plastic box with a lid. In this way the compound will not be dispersed throughout the room if the container is accidentally dropped.

Weighing a Compound by Difference:

- a) Rinse gloves with water to reduce static and remove glove powder.
- b) Select an appropriate type and size of container, eg. Falcon or Eppendorf tube or glass or plastic screw-capped scintillation vial determined by the approximate final volume and the nature of the diluent. Tare the capped container, ie. place the container on the weighing pan of an electronic balance and ZERO the balance.
- c) Carry the tared container to the fume hood and place it centrally on the benchcoat towards the back of the hood where air turbulence is minimal. Remove the lid from the tared container.
- d) **Before removing the lid from the bottle of chemical to be weighed, be aware of WHAT CAN GO WRONG!!! Precautions must be taken to prevent the chemical from being dispersed within the hood by the air current when transfers are carried out. FIRSTLY: the fume hood fan should be on the lowest setting, or, if necessary, temporarily turned off. SECONDLY: be aware that many hazardous substances have a strong static charge and will be attracted to or repelled by the transfer**

spatula and/or the container, especially if the container is plastic. Initially transfer a test amount of chemical to determine whether static is a problem. To prevent static, it may be necessary to change the tared container type or to use an anti-static agent on the outside of the container. **THIRDLY: ensure that the spatula, chemical bottle and tared container remain on the plastic backed benchcoat and that the exterior of the tared container does not become contaminated by handling it with dirty gloves or lying it on potentially contaminated benchcoat.**

- e) Having assessed the precautions to consider in d) above, remove the lid from the chemical container to be weighed and transfer an approximated amount of it to the tared (pre-weighed) container using a clean spatula. **Recap the tared container.**
- f) Take the capped container back to the balance and weigh and record the weight of the chemical. If the desired amount of chemical has not been transferred, return the container to the fume hood, add more chemical and re-weigh. **Whenever practical, adjust the volume of the diluent rather than the weight of the chemical ie. never return a portion of the chemical back to its original container.** Once the required weight of chemical has been transferred, recap the chemical container and return it to storage.

Dissolving Hazardous Substances:

- a) Never open containers of hazardous chemicals outside of the fume hood! To dissolve the weighed chemical, return the transfer container to the fume hood before removing the cap.
- b) Assemble the required pipettes, tips, volumetric glassware and diluent for dissolving the chemical in the fume hood. **Pipetting by mouth is prohibited at all times!!** Slowly and carefully add the diluent to the container without contacting the pipette tip with the container and without causing aerosols to form. Any required transfers to volumetric glassware should be done quantitatively using pipetting devices. **Do not decant.**
- c) Mixing to dissolve, eg. using a vortex mixer, should be done in the fume hood with the container closed. Heating to dissolve should be done in the fume hood with the container cap removed. Heating a closed container may cause an explosion! Never heat flammable solvents used as diluents!

Handling Liquid Carcinogenic or Toxic Chemicals:

- a) Always work in a fume hood.
- b) Have work area in the fume hood covered with plastic backed benchcoat.
- c) Make sure the container being transferred to is open and held in a stable holder.
- d) Use pipetting devices eg. disposable pipette and electric powered pipette aid or pipette and tip.
- e) Complete the transfer carefully to avoid dripping or contaminating the outside of either container.
- f) Recap both containers as quickly as possible.
- g) Contaminated tips and pipettes should be left in the fume hood to allow volatiles to evaporate then disposed of in the appropriate **Hazardous Waste** stream.

4. CONTINGENCY PLAN AND REPORTING:

- a) In the event that a spill occurs outside of the fume hood, take the appropriate safety precautions for cleanup and disposal that are described in the **Material Safety Data Sheet** for that chemical. Or, if in doubt, evacuate the room and seek help from co-workers, members of the Local JHSC or **Environmental Health and Safety** (ext. 53132) to initiate clean-up procedures.

- b) If the spill is a flammable solvent (eg. ethanol, methanol, acetonitrile) or a noxious liquid (eg. chloroform) used to dilute the hazardous chemical, follow the **Flammable Solvent Spill Management Procedure** posted at the **Spill Kit Station**. If necessary, evacuate the room and initiate fire procedures. If in doubt, leave the room immediately and seek help.
- c) If the spill is contained within the fume hood, lower the sash opening to about 10 cm (not completely closed) and take the appropriate safety precautions for cleanup and disposal that are described in the **MSDS** for that chemical and in those posted at the **Spill Kit Station**.
- d) Fill out an Injury/Incident Report form and contact **EHS**.

5. WASTE MANAGEMENT:

- a) **N.B. All streams of hazardous waste should be kept to a minimum. Plan experiments so that the amount of solid and/or liquid waste generated is as little as possible.**
- b) **Fume hood clean-up:** Wipe the spatula on the benchcoat and carefully fold the benchcoat so any contamination on its surface is contained. Place the folded benchcoat in a plastic bag along with any other potentially contaminated disposables, including gloves, tissues and paper towels. Put on fresh gloves, seal the bag and place it in the regular garbage stream if you are confident that it poses no hazard to co-workers and Custodial Services.
- c) If the benchcoat is known to be contaminated, divert it to Hazardous Waste disposal, tag the bag and leave it in the fume hood for Hazardous Waste pick up provided by EHS.

6. REFERENCES:

Occupational Health and Safety Act, R.S.O. 1990, sect 33-42
Laboratory Safety CSMLS Guidelines Fifth Ed. 2001

7. DISTRIBUTION OF COPIES:

Technicians, Graduate students, Project Students, other University of Guelph employees working in the lab

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