

HANDLING PROCEDURES FOR CHEMICAL WASTES

Researchers are expected to abide by all federal, provincial, municipal, and University guidelines regarding the disposal of all wastes. The Department has adopted the following procedure for the handling and disposal of chemical wastes, in accordance with these guidelines. The basis of the procedure is improved labeling, with the objective of preventing the build-up of wastes or avoiding accidents due to combination of incompatible wastes.

1. RESTRICTIONS

- a. Only chemical waste generated from laboratory operations will be collected for disposal.
 - i. Liquid chemical waste must not be flushed down drains.
 - ii. Solid or liquid waste chemicals must not be mixed with general garbage.
- b. The person producing the waste bears the primary responsibility for proper packaging and labelling of the waste.
- c. If the Chemical Safety Officer or waste removal company overseeing the collection has any doubts about proper labelling or packaging, the waste will not be removed, and will be returned to the lab that generated the waste.

2. CONTAINERS

- a. All containers intended for storage of chemical waste must be undamaged and properly sealed. Glass containers (not plastic) should be used.
- b. Liquid waste containers should be filled to about 75% of capacity. This allows room for expansion and reduces the potential for spills, leaks from overfilled containers, and possible overpressure from vapors.
- c. Incompatible chemicals should each have separate waste containers, and must not be mixed in a single container (see Appendices for waste classes and segregation)
- d. When the waste container is about 70 – 80% full or is more than 3 months old, it should be brought (in an approved bottle carrier) to WB16 via the freight elevator.

3. LABELS

- a. To prevent mixing of incompatible wastes, all waste bottles must be clearly identified using standard chemical waste labels.
- b. The following information should be on the label:
 - i. The generic name(s) of the component(s) in the container, along with an approximate composition
 - ii. Description of hazard / toxicity – try to use the GHS signal word
 - iii. Bottle code, consisting of supervisor's initials, room number, phone number, and waste class; see example below
- c. If label is incomplete, the waste will not be accepted nor removed.

Labels are available from Rodney Gensell in WB217, and from Phil Milczarek in WB16. More details on waste label requirements including classes of wastes are shown below.

Chemical Waste Disposal Bottle Label Information

Bottle Serial Number _____

Example of required serial number: BAS-128-E-2

BAS: supervisor's initials **128:** lab room number

E: category of waste (see below) **2:** bottle number

Classes of Waste:

Aa: Inorganic Acids Ab: Compounds which do not form gases when acidified Ac: Inert Inorganic Solids Ba: Organic and Inorganic Bases Bb: Acid Reactive Compounds that form gases when acidified C: Neutral Organic Solids	Da: Flammable Organic Liquids Db: Halogenated Solvents Dc: Organic Acids E: Oxidizing Agents F: Pesticides X: Specials (see list)
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An example of a typical label is shown below.

CHEMICAL WASTE	
NAME OF RESEARCHER:	DR. KATTA LISZT
BUILDING:	Central Lab
ROOM #	1200
PHONE #	8-7000
LIST OF CHEMICALS	APPROXIMATE %
Methanol	60 %
Chloroform	5 %
Toluene	35 %
NO SYRINGES, BIOHAZARDS OR RADIOACTIVES	
Special Hazards:	
<input type="checkbox"/> Unstable/Explosive	<input type="checkbox"/> Organic Peroxide
<input checked="" type="checkbox"/> Carcinogen	<input type="checkbox"/> Air or Water Reactive
<input checked="" type="checkbox"/> Other	Flammable / Toxic
WASTE WILL NOT BE REMOVED IF ALL SECTIONS ARE NOT COMPLETED	
For further information call 978-7030	

4. STORAGE OF WASTE CHEMICALS

- All wastes must be segregated according to class. Incompatible wastes must not be stored in the same container or in close proximity within the laboratory.
- Minimize storage of waste chemicals in the lab.
- Waste containers should be delivered to WB16F (or equivalent room if working outside of Wallberg). Waste bottles should be segregated - placed in the appropriately designated area in WB16F. Use a fire-rated solvent cabinet for flammable wastes.
- All safety precautions and volume limitations that apply to flammable and toxic chemicals must be adhered to.

Note that there are separate procedures for biological waste, broken (contaminated) glass, scintillation vials, sharps, etc. See <https://ehs.utoronto.ca/our-services/environmental-protection-services/> for more details, or speak to your safety committee.

The Bucket List

Getting rid of lab waste? Here's how to dispose of it.



Chemical Waste Pail

- Designate and label for lab specific use
- Ethidium Bromide gels
- Contaminated solids including plastics and glass
- No sharps
- Provided by EPS (6-3473)



Radioactive Solid Waste Container

- Contaminated plastics and solids
- Ensure tag provided is completed before pickup
- No liquid scintillation vials
- Provided by EPS (6-3473)



Radioactive Liquid Waste Container

- Radioactive aqueous liquid waste
- No liquid scintillation vial contents
- Green tag: half life <30 days
- Blue tag: half life >30 days & <90 days
- Yellow tag: half life >90 days
- Provided by EPS (6-3473)



Biohazard Waste Pail

- Risk Group 2 biologically contaminated solids
- No liquids, sharps, Risk Group 1 biologicals or animal anatomical waste
- Provided by EPS (6-3473)
- (Some locations receive pails that are lined)



Biohazard Bag

- Biologically contaminated solids only
- No sharps
- Purchased by lab



Sharps Container (CSA Approved)

- Needles, syringes, lancets, blades, etc.
- Designate, separate and label as Biological, Chemical or Radioactive waste
- Purchased by lab



Animal Anatomical Waste Pail

- All animal anatomical waste
- All materials contaminated with toxins requiring incineration
- Biobags, provided by DCM can be used to transport tissues to DCM
- Cytotoxic waste
- No biologically or chemically contaminated bedding
- Provided by EPS (6-3473)



Recycling Bin

- Untaminated paper
- Empty boxes
- Catalogues
- Provided by F&S (6-5711)



Regular Garbage

- Untaminated refuse (paper towels, pipet wrappers, etc.)
- Decontaminated Risk Group 1 biological solids
- Provided by Caretaking (8-6252)



Amber Laboratory Glass Tote

- Untaminated coloured glass (triple rinsed)
- No hazardous materials, garbage or gloves
- No clear glass
- Provided by F&S (6-5711)



Teal Laboratory Glass Tote

- Untaminated Clear glass (triple rinsed)
- No hazardous materials, garbage or gloves
- No coloured glass
- Provided by F&S (6-5711)



Orange Laboratory Plastic Tote

- Untaminated laboratory plastics (triple rinsed)
- No hazardous materials, garbage or gloves
- Provided by F&S (6-5711)



Office of Environmental Health & Safety
www.ehs.utoronto.ca

EPS: Environmental Protection Services; a subsidiary of Environmental Health & Safety
F&S: Facilities & Services



APPENDIX A: SEGREGATION OF CHEMICAL WASTE

It is recommended that waste chemicals be stored according to the following groupings based on chemical reactivities.

GROUP A - INORGANIC ACIDS AND ACID SALTS

- a) All inorganic acids, e.g. sulphuric acid, hydrochloric acid.
- b) All compounds which do not liberate a gas when acidified, e.g. ferric chloride.
- c) Inorganic solids which are inert may be included in this group, e.g. silica gel.

NOTE: Perchloric acid, although an inorganic acid, is a powerful oxidizer and should be included in Group E.

GROUP B - AMINE CAUSTICS AND ACID-REACTIVE COMPOUNDS

- a) All caustic chemicals - both organic and inorganic bases, e.g. pyridine, sodium hydroxide.
- b) Elements and inorganic salts that may react with acids to liberate gaseous products, e.g. potassium cyanide, ferric sulphide.

GROUP C - NEUTRAL ORGANIC SOLIDS

- a) All solid organic compounds - no acids or bases, e.g. carbon black, solidified styrene.

GROUP D - FLAMMABLE LIQUIDS AND ORGANIC ACIDS

- a) All organic liquids (excluding organic bases), e.g. chloroform, toluene.
- b) Organic acids - solids and liquid states, e.g. acetic acid, formic acid.

GROUP E - OXIDIZERS

- a) Any inorganic compound that assists fire, e.g. hydrogen peroxide, lead nitrate.

GROUP F - PESTICIDES

- a) Any solids used to destroy or inhibit plant or animal pests such as pesticides, fungicides, insecticides, etc. – e.g. DDT, fungicide FT-A.

GROUP SPECIALS - WATER AND AIR REACTIVE COMPOUNDS

- a) All chemicals which react with air and water, including fuming substances, e.g. sodium (water reactive), phosphorus (air reactive), lithium aluminum hydride (both air and water reactive), other fuming substances: thionyl chloride and phosphorus tribromide.

If any waste cannot be classified according to the aforementioned groups (e.g. explosives), the Chemical Safety Officer should be consulted.

The following Table A can be used to assist in classifying chemical waste.

Once the waste has been classified according to the chemical groups, it must be segregated to minimize the risk of mixing incompatible groups.

The following two plans show possible combinations of storing waste according to chemical groupings.

FIGURE A - shows a possible storage plan if no shelving is present.

FIGURE B - shows a possible way of segregating waste chemicals should shelving in the waste-holding facility be present.

The exact plan for segregating the waste may vary according to individual storage areas. In every case the following groups must be kept apart:

- i. GROUP E must be segregated from GROUP C and GROUP D.
- ii. GROUP A must be kept away from GROUP B.

TABLE A: CLASSIFICATION OF CHEMICAL WASTE FOR PURPOSE OF SEGREGATION

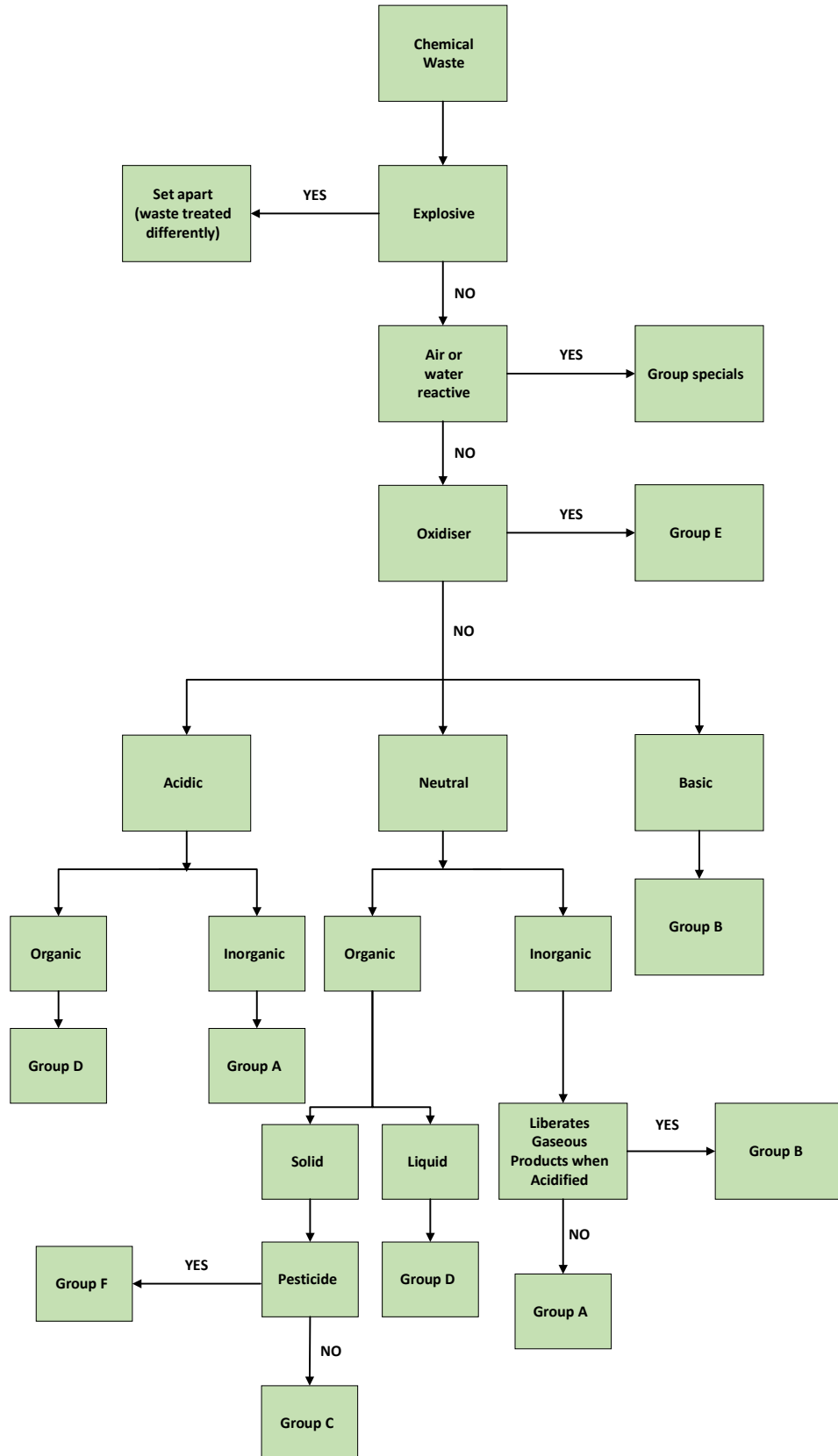


FIGURE A: FLOOR PLAN FOR WASTE SEGREGATION (NO SHELVING)

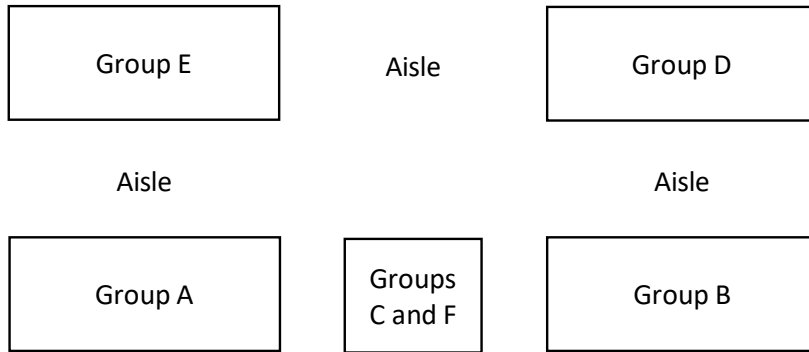
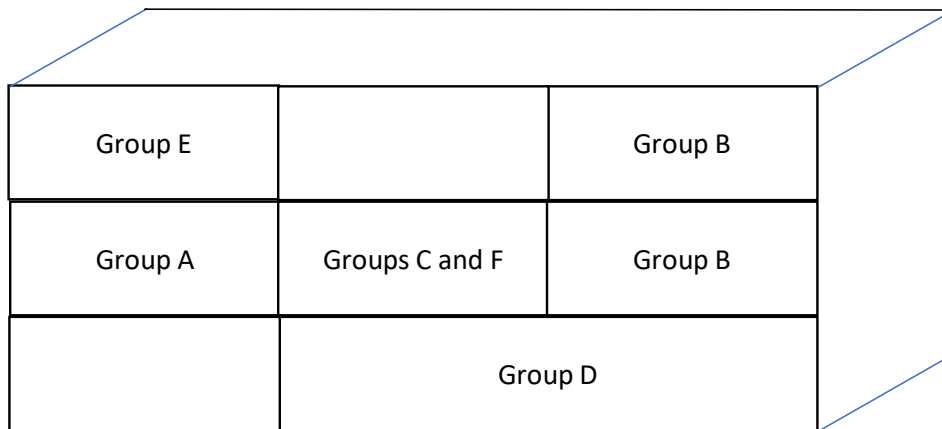


FIGURE B: PLAN FOR WASTE SEGREGATION (SHELVING)



Notes:

- i. Group "Specials" stored separately
- ii. If necessary, store group "D" in a flammable liquid storage cabinet. At minimum, use a separate shelf for Group D.

Chemical Incompatibilities

When preparing chemical waste for disposal, the person(s) generating the waste are responsible to ensure that incompatible chemicals are not stored in the same container.

A few general examples are:

1. Oxidizers should never be mixed with (or stored close to) reducers or any organic materials.
2. Acid-reactive compounds (e.g., cyanides) which may liberate gaseous products when acidified should not be mixed with (or stored close to) any acid.
3. Organic acids should be segregated from inorganic acids - generally inorganic acids are oxidizers while some organic acids may either be reducers or combustible in nature.
4. Water-reactive compounds (e.g., sodium metal) are reducers, and therefore should not be in contact with (or stored close to) oxidizers.