Technical guidelines for the disposal of Empty Chemical Bottles And Hazardous chemical Waste Storage

1. Empty chemical container disposal guidelines

Empty chemical containers can contain residual amounts of chemicals .In an effort to ensure that this residue is handled properly and to be able to recycle or properly dispose of these containers, the following procedure must be followed.

Rinse procedure:

1. All chemical containers, liquid or solid, must be rinsed three times before being discarded. A rinse should consist of minimal water being used to rinse the container.
2. The first rinse should be collected as chemical waste, it can be put in to any waste container of compatible chemicals, the second and third rinses can then go down the drain.
3. Dry the empty container in a well ventilated area.
4. Use a fume hood (if you have access to one) or find an area away from where people are working.
5. Use proper PPEs during rinsing of chemical bottles or containers.
6. Deface the container label and place it next to your lab trash, or dispose of it in your building's garbage dumpster. chemical name should be crossed or blacked out prior to being discarded
7. Any broken glass containers must be placed in a rigid box that is marked as "broken glass". These boxes may be placed *with* (not in) the regular trash for collection.

These containers should be stored separately and submit bottle disposal request to OLSEH office. Empty chemical bottle will be collected by OLSEH office at the time of bottle disposal program.

2. Chemical Waste segregation

Hazardous waste needs to be segregated and disposed in the following manner to comply with the departmental waste management policy.

Chemical segregation

1. Acids + solvents mixture can spontaneously ignite. Never store/leave a solvent + acid mixture in the lab unattended. If you do happen to make such a solution, segregate it and take it outside of the building to the waster shed.

2. Acidic waste with fluoride ions must be collected separately in plastic containers, e.g. dilute hydrofluoric acid, ammonium fluoride and buffered-oxide etch.
3. Acidic wastes which contain toxic metal salts (Cr, Pb, etc.) cannot be buried in a chemical landfill, so must be collected separately.
4. Acid waste that does not contain metallic toxins or fluoride and have a pH>4 can be disposed into the drain with copious amounts of water
5. Acid waste that does not contain metallic toxins or fluoride and have a pH<4 must be separately collected in plastic containers. IISc does not allow individuals to neutralize acids.
6. Acids + oxidizers react and evolve gas. So unattended acids + oxidizer mixtures present an explosion hazard — in extreme cases plastic bottle can burst spraying acid everywhere. Fresh acids + oxidizer mixtures must be collected separately and kept inside the fume hood for 1 day. This allows time for the reaction to complete and gasses to escape. Nitric acid is both a strong acid and an oxidizer so solutions containing HNO_3 it should be treated as an acid + oxidizer.
7. Solvents + oxidizer mixture can also spontaneously ignite. Never store/leave a solvents + oxidizer mixture in the lab unattended. If you do happen to make such a solution, segregate it and take it outside of the building to the waste shed.
8. Base + solvent mixtures also evolve gasses. So unattended base + oxidizer mixtures present an explosion hazard — in extreme cases plastic bottle can burst spraying base everywhere. Fresh base + oxidizer mixtures must be collected separately and kept inside the fume hood for 1 day. This allows time for the reaction to complete and gasses to escape.

9. Solvents must be separately collected in plastic or metal containers, e.g. benzene, ether, ethyl acetate, acetone, alcohols, hydrocarbons, etc.
10. Non-toxic basic waste with a pH<10 can be disposed into the drain with copious amounts of water
11. Basic waste with pH > 10 , must be separately collected in plastic container. IISc does not allow individuals to neutralize bases. If they do not have any oxidizer, bases can be stored with solvents.

Chemical Hazard Always refer to the SDS	Flammable	Acid	Base	Oxidizer	Toxic
Flammable					
Acid					
Base					
Oxidizer					
Toxic					

3. Storage and Handling of Hazardous Wastes: According to the guidelines of Central pollution control board, chemical waste should be stored in followings manner

❖ Storage Area (Storage Shed):

a) Flammable, ignitable, reactive and non-compatible wastes should be stored separately and never should be stored in the same storage shed.
b) Storage area may consist of different kinds of hazardous wastes and sheds should be provided with suitable openings.
c) Storage area should be provided with the flameproof electrical fittings and it should be strictly adhered to.
d) Automatic smoke, heat detection system should be provided in the sheds. Adequate fire fighting systems should be provided for the storage area, along with the areas in the facility..
e) Loading and unloading of wastes in storage sheds should only be done under the supervision of the well trained and experienced staff.
f) Fire break of at least 04 meter between two blocks of stacked drums should be provided in the storage shed. One block of drum should not exceed 300 MT of waste.
g) Minimum of 1 meter clear space should be left between two adjacent rows of drums in pair for inspection.
h) The storage and handling should have at least two routes to escape in the event of any fire in the area.
i) Doors and approaches of the storage area should be of suitable sizes for entry of fork lift and firefighting equipment.
j) In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area should be provided with concrete floor or steel sheet depending on the characteristics of waste handled and the floor must be structurally sound and chemically compatible with wastes.
k) The storage area floor should be provided with secondary containment such as proper slopes as well as collection pit so as to collect wash water and the leakages/spills etc.

l) All the storage yards should be provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills in roads or within the storage yards as well as accidental flow due to fire fighting.

❖ **Storage Drums/Containers:**

a) The container shall be made or lined with the suitable material, which will not react with, or in other words compatible with the hazardous wastes proposed to be stored.
b) No drums should be opened in the storage sheds for sampling etc. and such activity should be done in designated places outside the storage areas.
c) Drums containing wastes stored in the storage area should be labeled properly indicating mainly type, quantity, characteristics, source and date of storing etc.

❖ **Spillage/leakage control measures:**

a) The storage areas should be inspected daily for detecting any signs of leaks or deterioration if any. Leaking or deteriorated containers should be removed and ensured that such contents are transferred to a sound container.
b) In case of spills / leaks/dry adsorbents/cotton should be used for cleaning instead of water.
c) Proper slope with collection pits be provided in the storage area so as to collect the spills/leakages.
d) Storage areas should be provided with adequate number of spill kits at suitable locations. The spill kits should be provided with compatible sorbent material in adequate quantity.

❖ **Record Keeping and Maintenance:** Proper records with regard to the type of waste received, characteristics as well as the location of the wastes that have been stored in the facility need to be maintained.

❖ **Precautions :**

a) Smoking shall be prohibited in and around the storage areas;
b) Good housekeeping needs to be maintained around the storage areas.
c) Signboards showing precautionary measures to be taken, in case of normal and emergency situations should be displayed at appropriate locations.
d) The wastes containing volatile solvents or other low vapor pressure chemicals should be adequately protected from direct exposure to sunlight and adequate ventilation should be provided.
e) Only persons authorized to enter and trained in hazardous waste handling procedures should have access to the storage site.