

Subject: Engineering Chemistry

CO 1-5: Life-long Learning

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Experiment No. 1

Title: Good laboratory Practices (GLP)

Aim: Role of Engineering Chemistry in Day to day Life and familiarization with GLP.

Instructions:

Following things are required to perform the experiments in the chemistry lab,

Laboratory Coat: A laboratory white coat must be worn at all times while in the laboratory when anyone is conducting experiments.

Closed Shoes: Wear closed shoes at all times while in the laboratory and confine long hair when in the laboratory

Scientific Calculator: This calculator should preferably be equipped with log, ln, exp, and 1/x functions.

Lab Write-up: Bring lab write up for all the experiments

DO'S

- 1. Use protective clothing all the time (e.g. lab coat and safety glasses). Wear closed shoes.
- 2. Be familiar with your lab assignment before you come to lab. Follow all written and verbal instructions carefully. Observe the safety alerts in the laboratory directions. If you do not understand a direction or part of a procedure, ask the teacher before proceeding.
- 3. Wash acid, base, or any chemical spill off yourself immediately with large amounts of water. Notify your teacher of the spill.



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- 4. Clean up spills immediately. If you spill a very reactive substance such as an acid or base, notify the people in the area and then obtain assistance from your teacher. Acid spills should be neutralized with baking soda, base spills with vinegar before cleaning them up.
- 5. If chemical substances get in your eye, wash the eye out for 15 minutes. Hold your eye open with your fingers while washing it out.
- 6. Place the reagents in a systemic manner.
- 7. If you burn yourself on a hot object, immediately hold the burned area under cold water for 15 minutes. Inform your teacher.
- 8. Follow above good laboratory practices (GLP). Work areas should be kept clean and tidy at all times. Only lab notebooks or lab handouts should be out on the table while performing an experiment. Books and book bags should not be on the lab table. Passageways need to be clear at all times.
- Work with dangerous or volatile chemicals in a fume hood as directed by your instructor and/or lab manual.

DON'T

- 1. Do not Work in the laboratory without an instructor present. Do not venture to other lab stations for any reason.
- 2. Do not wear bulky or dangling clothing.
- 3. Do not eat or drink in the laboratory.
- 4. Do not use Mobile Phones.
- 5. Do not directly touch any chemical with your hands. Never taste materials in the laboratory.
- Do not enter the lab/ classroom, do not touch any equipment, chemicals, or other materials without being instructed to do so.
- 7. Never place chemicals directly on the balance pan also not to weigh a hot object.
- Absolutely no running, practical jokes, or horseplay is allowed in the laboratory.
- Do not allow the reagent bottles to accumulate on the bench.
- 10. Do not force glass tubing or thermometers into rubber stoppers. The tubing or thermometer may break and cut you badly. Consult with your laboratory instructor for assistance.

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11. Do not perform unauthorized experiments. If you see someone else doing something you think may be dangerous, tell him or her to stop and/or report the incident to your lab instructor. If another student tells you to stop doing something because it is unsafe, stop as directed. Consult your lab instructor if there is a problem or difference of opinion.

Handling Accidents

- 1. Notify your lab instructor immediately if you have an accident, spill, or are injured in any way.
- 2. If chemicals come in contact with your skin or eyes, wash with water for at least 15 minutes. It is not recommended to wear contact lenses in the laboratory since chemicals splashed in the eye may get under the lens therefore be difficult to rinse. If a splash occurs while you are wearing contact lenses, they must be safely removed as quickly as possible.
- 3. Know where to find and how to use the safety shower in the front of the room.
- 4. Clean up spilled chemicals immediately. Consult your laboratory instructor if you are not sure what to do.
- 5. Solid sodium bicarbonate (baking soda) is available in the laboratories in containers located by the sinks. Use this to neutralize acid spills before wiping them up. Similarly, solid citric acid solution is available in containers by the sinks and should be used to neutralize base spills before wiping them up. A saturated solution of sodium bicarbonate is also available by the sinks and can be used to wipe dried acid or base residue off of lab benches as needed. However, if acid or base spills on your skin, don't waste time looking for these neutralizing substances. Rinse with water immediately for at least 15 minutes.

Proper Waste Disposal

Separate waste as follows:

a. Waste chemicals should be disposed of as directed by your lab instructor. Most chemicals are NOT to be thrown down the sink. Special waste receptacles will be provided for these chemicals. Waste chemicals must be sorted by kind, not just mixed with other, different waste chemicals. Read waste container labels carefully.



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Broken glass is to be disposed of in the cardboard boxes labeled "Broken Glass Only" located near the doors to the lab. A dustpan and broom are located in each lab to assist you in cleaning up broken glass. Do not put broken glass in the regular trash, and do not put anything except broken glass in the broken glass containers.

Implementation of Control Measures

A. When to use fume hoods:

Hoods should be used WHENEVER POSSIBLE to contain and exhaust toxic, offensive, or flammable materials. Processes that have potential for generating hazardous airborne chemical concentrations must be carried out within a fume hood.

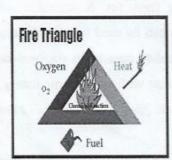
B. When to use personal protective equipment: Eye Protection - Safety goggles must be worn by all personnel in the laboratory whenever hazardous chemicals are in use. NO EXCEPTIONS.

Gloves - Gloves should be worn to protect the skin from chemical and physical (e.g. heat, cold) exposures. Thermal resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal resistant gloves shall be non-asbestos and shall be replaced when damaged.

Fire Safety & Fire Extinguisher Use



How Does a Fire Work?



- · Three components
- Need all three components to start a fire
- Fire extinguishers remove one or more of the components

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Types of Fires



 Class A - Wood, paper, cloth, trash



 Class B - Flammable liquids, oil, gas, grease



 Class C - Electrical, energized electrical equipment

· Class D - Combustible metals

Different Kinds of Extinguishers

The 4 most common fire extinguishers:

- All Purpose Water
- Carbon Dioxide
- Multi-Purpose Dry Chemical
- Dry Powder

Each kind of extinguisher has a specific use

Carbon Dioxide

All Purpose Water





- · Use on CLASS A fires
- · Pressurized water
- · Pressure gauge present

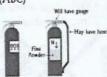
Carbon Dioxide Extinguisher



- Use on CLASS B and CLASS C fires
- · Hard, plastic nozzle
- · No pressure gauge

Multi-Purpose Dry Chemical

Dry Chemical Extinguisher (ABC)



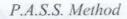
- Use on CLASS A, CLASS B, and CLASS C fires
- Fine powder under pressure
- · Pressure gauge present

How to Use a Fire Extinguisher



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P.A.S.S. Method





Pull the pin

This will allow you to squeeze the handle in order to discharge the extinguisher



Aim at the base of the fire

Aiming at the middle will do no good. The agent will pass through the flames.

P.A.S.S. Method

P.A.S.S. Method



Squeeze the handle

This will release the pressurized extinguishing agent



Sweep side to side

Cover the entire area that is on fire. Continue until fire is extinguished. Keep an eye on the area for re-lighting.

When NOT to Fight a Fire!



- Remember to keep an exit to your back
- Only fight a fire in the incipient stage



Most Important Slide

NEVER fight a fire if any of the following apply:

- Don't have the proper extinguisher or equipment
- · Fire has spread beyond its point of origin
- · Your instincts tell you GET OUT



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Emergency Procedures

In the Event of Fire

- · Pull nearest alarm station
- · Immediately exit the building

If you hear an alarm
DO NOT

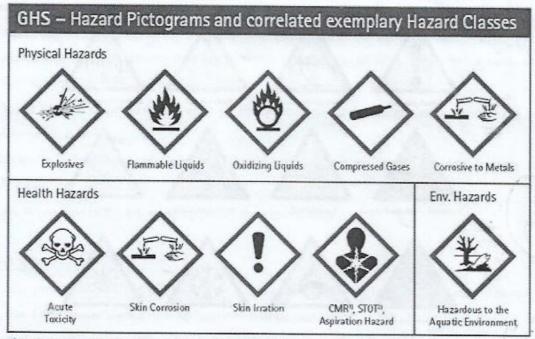
assume it is a drill, your life may depend on it!

Emergency Procedures

Building Evacuation

- · Proceed to nearest exit in an orderly fashion
- · Assemble at least 100 feet from building
- Provide emergency crews with information about people still in the building
- Provide information to emergency crews about the reason for evacuation
- Never re-enter a building until instructed to by the police department, fire department, or EHS staff.

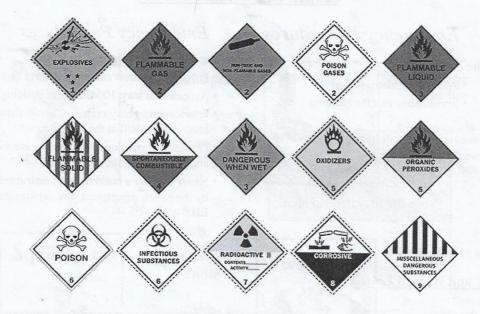
Safety and Hazard Labels



¹⁾ carcinogenic, germ cell mutagenic, toxic to reproduction / 2) specific target organ toxicity



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Generic caution









Radiation – high-level source









Explosive







Optical radiation



Oxidizing



Health danger



Carcinogen



Chemical weapon