Lab 1034 Safety Plan

8/26/2022

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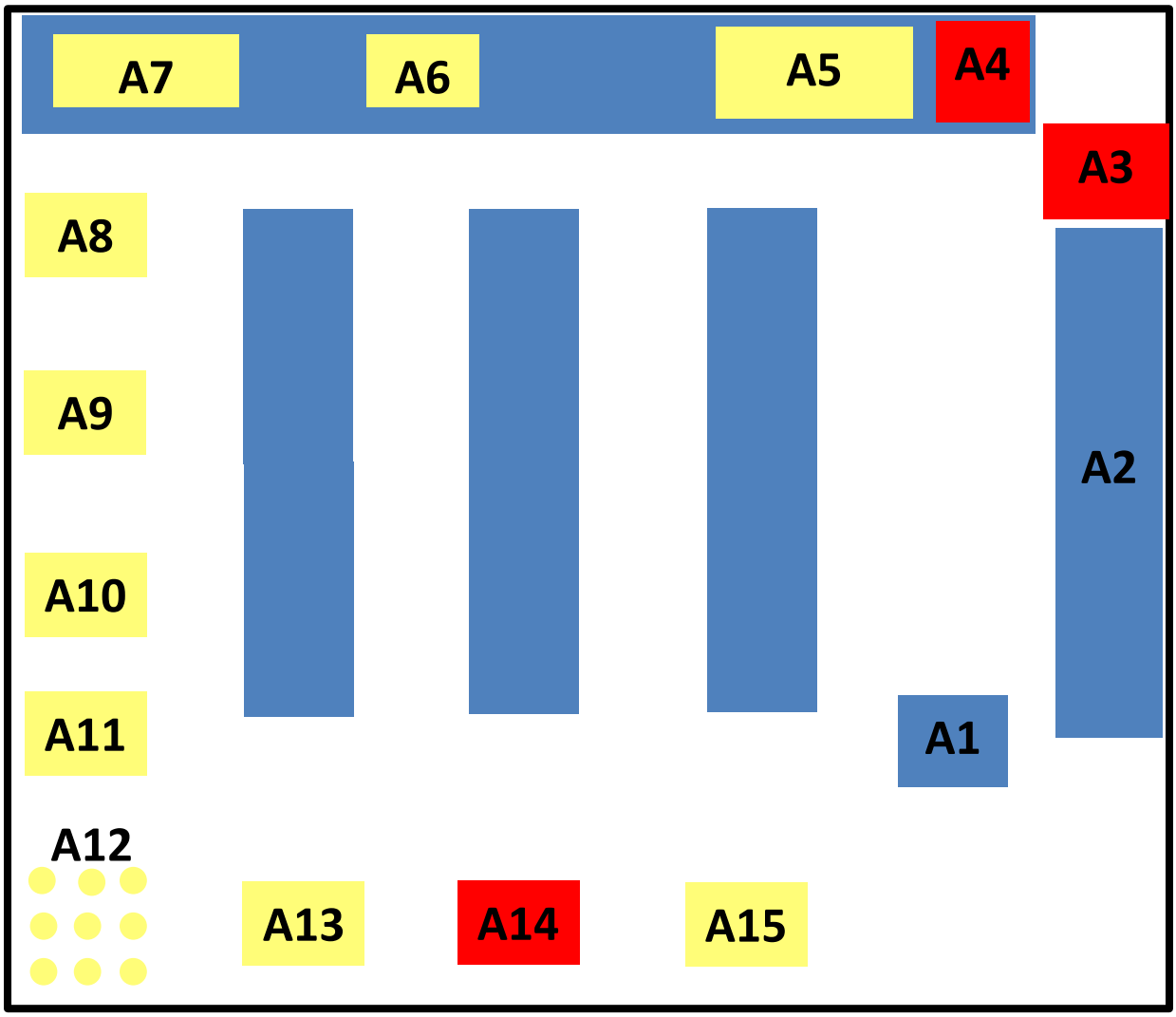
Chemical Engineering Laboratory RBN 1034



A1. Podium for teaching

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2 Responsible parties for the laboratory locations

Dr. Fernando Resende	206-617-8440
Dr. Aaditya Khanal	832-607-1689
Dr. Carla Lacerda	970-672-7752
Dr. Zishu Cao	513-356-3676

3 Emergency contact information

University Police

Emergency – 911

Non-Emergency – 903-566-7300

Environmental Health and Safety

Emergencies (24 hrs/day, 7 days/week) – 903-566-7011

Facilities

Any Time – 903-566-7060

AFTER emergency is reported, contact one of the responsible parties above.

4 Location of SDSs, Chemical Hygiene Plan and any other laboratory documents

Safety Data Sheets	https://uttyler.bioraft.com/raft/research_tools/SDS
Chemical Inventory	https://uttyler.bioraft.com/
Chemical Hygiene Plan	https://www.uttyler.edu/safety/files/chemical-hygiene-plan.pdf
Laboratory Safety Manual	https://www.uttyler.edu/safety/files/laboratory-safety-policy.pdf
Waste Pickup Requests	https://uttyler.bioraft.com/

5 Identification of chemical and biological hazards in the laboratory

Hazard	Specific Name	Location	Mitigation	References
Flammability	Acetone, Ethanol, Methanol, Hexane, Propanol, Butanol, Decane, Ethyl Acetate	Flammables cabinet	Use of hood, PPE	SDS, spill containment
Acid	Acetic Acid, Hydrochloric Acid, Formic Acid, Propionic Acid	Acid storage locations	Use of hood, PPE	SDS, spill containment
Base	Sodium Hydroxide, Potassium Hydroxide	Base storage cabinets	Use of hood, PPE	SDS, spill containment
Corrosive	Hydrogen Peroxide, Cerium Nitrate	Corrosive storage location	Use of hood, PPE	SDS, spill containment
Biologicals	Cell cultures	CO_2 incubators and -80 freezer	Use of bio hood, PPE	Cell datasheet
Gas release	Carbon dioxide, Hydrogen	Gas cylinders	Use of purge, PPE	SDS, ventilation

6 Identification of physical hazards in the laboratory

Hazard	Specific Unit	Mitigation	References
Low Temperature	-80 freezer, lyophilizer	Use of PPE	User manual
High Temperature	Hot plates, all reactors, distillation column, heat exchange apparatuses	Use of PPE	User manual
Pressure	Gas cylinders, high pressure reactor	Use of PPE	User manual
Puncture	Bioprinter needles, broken glass	Use of PPE	User manual
Electrical	All equipment	Use of PPE	User manual

7 Clean-up procedures in case of a spill

To determine whether a spill is simple or complex, you need to know (1) the hazard posed by the spilled chemical and (2) the spill's potential impact. Both these factors are, in large part, determined by the spill's size. The following information will help you determine whether you have a simple spill:

- the type of chemical(s) spilled,
- the amount (< 1 L),
- the hazardous characteristics of the spilled chemical,
- the location,
- the proper method for cleaning up the spill,
- the personal protective equipment available, and
- the training of the laboratory's personnel.

For simple spills, emergency responders do not need to be notified. However, you should contact the environmental health and safety office or other responsible person within your facility. Most importantly, before cleaning up a simple spill, be sure that you can do so safely. You must have the right personal protective equipment, including, at a minimum, appropriate eye protection, protective gloves, and a lab coat. Additional protective equipment may be required for spills that present special hazards (such as corrosive or reactive spills or spills that have a splash potential). The following steps should be taken during spill cleanup:

a. Prevent the spread of dusts and vapors.

If the substance is volatile or can produce airborne dusts, close the laboratory door and increase ventilation (through fume hoods, for example) to prevent the spread of dusts and vapors to other areas.

b. Neutralize acids and bases, if possible.

Spills of most liquid acids or bases, once neutralized, can be mopped up and rinsed down the drain (to the sanitary sewer). However, be careful because the neutralization process is often vigorous, causing splashes and yielding large amounts of heat. Neutralize acids with soda ash or sodium bicarbonate. Bases can be neutralized with citric acid or ascorbic acid. Use pH paper to determine when acid or base spills have been neutralized.

c. Control the spread of the liquid.

Contain the spill with the spill kit materials located under the lab sink. Make a dike around the outside edges of the spill. Use absorbent materials such as vermiculite, cat litter, or spill pillows.

d. Absorb the liquid.

Add absorbents to the spill, working from the spill's outer edges toward the center. Absorbent materials, such as cat litter or vermiculite, are relatively inexpensive and work well, although they are messy. Spill pillows are not as messy as other absorbents, but they are more expensive. Note that special absorbents are required for chemicals such as hydrofluoric and concentrated sulfuric acids.

e. Collect and contain the cleanup residues.

The neutralized spill residue or the absorbent should be scooped, swept, or otherwise placed into a plastic bucket or other container. For dry powders or liquids absorbed to dryness, double bag the residue using plastic bags. Additional packaging may be required before the wastes can be transported from your laboratory. For spills of powders or solid materials, you may need to add a dust suppressant. Be sure to place descriptive labels on each container.

f. Dispose of the wastes.

Keep cleanup materials separate from normal trash. Contact your environmental health and safety officer for guidance in packaging and labeling cleanup residues. Promptly place cleanup wastes in an appropriate hazardous waste receptacle.

g. Decontaminate the area and affected equipment.

Ventilating the spill area may be necessary. Open windows or use a fan unless the area is under negative pressure. In some instances, your environmental health and safety officer can test the air to ensure that hazardous vapors are gone. For most spills, conventional cleaning products, applied with a mop or sponge, will provide adequate decontamination. If you have any question about the suitability of a decontaminating agent, seek expert advice.

8 Guidance on what to do in a case of emergency (e.g. fire, medical emergency, severe weather, etc.)

FIRE EMERGENCY GUIDANCE

- If there is ever immediate danger to your person, leave laboratory immediately and call 911.
- In this laboratory, possible fires will require the use of lab fire extinguisher (see map for location).
- If the building fire alarm sounds, follow emergency shutdown procedures for all running equipment and leave the building through the nearest exit.

MEDICAL EMERGENCY GUIDANCE

- Know the first aid treatment for the potential hazards of your equipment that may cause bodily injury or chemical exposure. For example, some liquids when exposed to the skin should be washed with water and some should not. KNOW THE HAZARDS YOU ARE DEALING WITH BEFORE AN EMERGENCY.
- For minor physical injuries, the first aid kit is located in the sink area cabinet (see map).
- If exposed to liquid chemicals, follow directions on SDS. If you suffer any acute symptoms call 911.
- If exposed to vapors, leave area and go outside for fresh air. If you suffer any acute symptoms call 911.
- If you are uncertain of what to do due to an exposure to a particular substance, call EH&S emergency number: 903-566-7011

SEVERE WEATHER EMERGENCY GUIDANCE

- -RBN 1034 (this lab) or basement restrooms

9 SOPs for laboratory 1034

A5. Corrosion Studies Kit:

- Item # on lab map: **A5**
- Manufacturer and Model: **Armfield CEQ**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Long pants
- Safety glasses or goggles, as appropriate
- Laboratory coat
- Chemical resistant gloves

Accidental Release Procedures

This equipment includes handling large volumes of hazardous liquids. Follow procedures for chemical spill containment as detailed on pages 6-7.

Waste Disposal Procedures

Use of this equipment inherently results in waste generation. Please collect and segregate wastes as instructed and submit a Waste Pickup Request as soon as possible.

Training

For minimum training on this equipment, consult Dr. Lacerda. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

The major potential hazards associated with Corrosions Studies Kit:

- Injury through misuse
- Injury from electric shock
- Injury from toxic materials (e.g. mercury)
- Injury from fast moving air streams or high-pressure air hoses
- Damage to eyesight
- Damage to clothing

Electrical Safety:

It is recommended that an Earth Leakage Circuit Breaker (ELCB) be fitted to this equipment. If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.

At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

A6. Cavitation Demonstration

- Item # on lab map: **A6**
- Manufacturer and Model: **Armfield F1-28**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves optional

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Electrical Safety:

The Cavitation Demonstration Apparatus is attached to a Hydraulics Bench that operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment.

The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.

At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used

- The Cavitation Demonstration must not be operated with any of the electrical panels open.
- The apparatus must not be left unattended to when switched on.

Water Borne Hazards:

- Any water contained within the product must not be allowed to stagnate.
- Any rust, scale, or algae must be removed regularly.
- When practicable the water should be maintained below 20°C. If this is not practicable, the water should be disinfected if it is safe and appropriate to do so.

A7. Losses in Bends

- Item # on lab map: **A7**
- Manufacturer and Model: **Armfield F1-22**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves optional

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Electrical Safety:

The equipment described in the Instruction Manual operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment or the mains lead.

The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.

At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

A8. Centrifugal Pump

- Item # on lab map: **A8**
- Manufacturer and Model: **Armfield FM50**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Electrical Safety:

The equipment described in the Instruction Manual operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment or the mains lead.

The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.

At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

Wet Environment:

The equipment requires a header tank containing water. During use it is possible that there will be some spillage.

- "Wet floor" warnings should be displayed when appropriate.
- Electrical devices in the vicinity of the equipment must be suitable for use in wet environments or be properly protected from wetting.

Moving or Rotating Components

- Do not dismantle the equipment while the equipment is in operation.
- Do not insert any item into moving section of the equipment.
- Ensure that the apparatus is switched off and all moving parts have come to rest before changing the pump impeller.

Heavy Equipment

- To avoid warping the baseplate, the apparatus should be drained before being moved.
- Safety gloves should be worn if appropriate

Water Borne Hazards:

- Any water contained within the product must not be allowed to stagnate.
- Any rust, scale, or algae must be removed regularly.
- When practicable the water should be maintained below 20°C. If this is not practicable, the water should be disinfected if it is safe and appropriate to do so.

A9. Heat Exchanger Unit with Attachments

- Item # on lab map: **A9**
- Manufacturer and Model: **Armfield HT30, HT33, HT31**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves optional

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Electrical Safety:

The equipment described in the Instruction Manual operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment or the mains lead.

The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.

At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

Water Borne Hazards:

- Any water contained within the product must not be allowed to stagnate.
- Any rust, scale, or algae must be removed regularly.
- When practicable the water should be maintained below 20°C. If this is not practicable, the water should be disinfected if it is safe and appropriate to do so.

Hot Surfaces/Liquids:

- Allow time for equipment to cool before handling any of the components.
- Do not touch any surfaces with “Hot Surfaces” warning label.
- Do not allow the apparatus to come into contact with flammable materials or liquids.
- Do not cover or store equipment until it has cooled.
- The apparatus should not be left unattended to when switched on.
- Allow time for the apparatus to cool before disconnecting the tubing.
- Avoid skin contact with hot liquids.

A10. Osborne Reynolds Apparatus

- Item # on lab map: **A10**
- Manufacturer and Model: **Armfield F1-20**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Water Borne Hazards:

- Any water contained within the product must not be allowed to stagnate.
- Any rust, scale, or algae must be removed regularly.
- When practicable the water should be maintained below 20°C. If this is not practicable, the water should be disinfected if it is safe and appropriate to do so.

A11. Hydraulics Bench

- Item # on lab map: **A11**
- Manufacturer and Model: **Armfield F1-10**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

A13.Liquid-Liquid Extraction

- Item # on lab map: **A13**
- Manufacturer and Model: **Armfield UOP5-MKII**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Long pants
- Safety glasses or goggles, as appropriate
- Laboratory coat
- Chemical resistant gloves

Accidental Release Procedures

This equipment contains many valves. If any of the valves are open, there is a possibility of water, oil, or propionic acid leakage. Follow procedures for large waste containment as detailed on pages 6-7.

Waste Disposal Procedures

Segregate water from oil phases. Place organic and aqueous phases in separate waste containers.

Training

For minimum training on this equipment, please consult Dr. Lacerda. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment.

Water Borne Hazards:

- Any water contained within the product must not be allowed to stagnate.

- Any rust, scale, or algae must be removed regularly.
- When practicable the water should be maintained below 20°C. If this is not practicable, the water should be disinfected if it is safe and appropriate to do so.

Electrical Safety:

- The equipment described in the Instruction Manual operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment or the mains lead.
- The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.
- At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

A15.Water Cooling Tower

- Item # on lab map: **A15**
- Manufacturer and Model**: Armfield UOP6-MKII**
- Use: **Undergraduate**

Minimum Required Personal Protective Equipment

- Closed-toe shoes
- Safety glasses or goggles, as appropriate
- Chemical resistant gloves

Accidental Release Procedures

Use of this equipment involves water. Follow procedures for water spill containment as detailed on pages 6-7.

Waste Disposal Procedures

No wastes are generated.

Training

For minimum training on this equipment, please consult Dr. Khanal. Do not attempt to conduct any experiments without proper training.

Protocols

Please consult digital manufacturer booklet for tested protocols used with this equipment

Electrical Safety:

- The equipment described in the Instruction Manual operates from a mains voltage electrical supply. It must be connected to a supply of the same frequency and voltage as marked on the equipment or the mains lead.

- The unit incorporates an Earth Leakage Circuit Breaker (ELCB). If through misuse or accident this equipment electronically dangerous, an ELCB will switch off the electrical supply and reduce the severity of any electric shock received by an operator.
- At least once each month, check that the ELCB by pressing the TEST button. The circuit breaker MUST trip when the button is pressed. Failure to trip means that the operator is not protected, and the equipment must be checked by an electrician before it is used.

Wet Environment:

The equipment requires a header tank containing water. During use it is possible that there will be some spillage.

- "Wet floor" warnings should be displayed when appropriate.
- Electrical devices in the vicinity of the equipment must be suitable for use in wet environments or be properly protected from wetting.