

**LABORATORY SAFETY PLAN**

**Insert Laboratory Name**

This Lab Safety Plan is intended for the laboratory indicated below and is supplemental to the institutional requirements outlined in the KAUST Laboratory Safety Manual found at <https://hse.kaust.edu.sa/services/lab-safety>.

**All fields highlighted below must be filled in!**

|  |  |
| --- | --- |
| **Laboratory Name:** | Insert Laboratory Name |
| **Division/Center** | Insert Name of Division or Center |
| **Center Director/PI:** | Insert Center Director or PI Name |
| **Phone:** | Insert Phone Number |
| **Email:** | Insert Email Address |

In accordance with University Policy, Center Directors or Principal Investigators are responsible for the health and safety of employees engaged in activities under their direction. Center Director or Principal Investigators are therefore expected to ensure:

Compliance with the guidelines, requirements and spirit of the Laboratory Safety Manual.

A Laboratory Safety Plan, that identifies the specific risks and required controls (in the form of Standard Operating Procedures or SOPs) is available and communicated to laboratory personnel.

All persons working in the laboratory are properly trained in, and conform to, proper health and safety protocols.

**Center Director or PI Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Date of Preparation:** Click or tap to enter a date.

**Date of Next Review:** Click or tap to enter a date.

(The Lab Safety Plan shall be reviewed/updated whenever significant new risks are introduced into the Laboratory, but not less than annually).

**Table of Content**

[1. Introduction 5](#_Toc29383152)

[1.1 KAUST Laboratory Safety Manual 5](#_Toc29383153)

[1.2 Laboratory Safety Plan 5](#_Toc29383154)

[2. Laboratory Description 5](#_Toc29383155)

[2.1 Key Safety Personnel 6](#_Toc29383156)

[2.2 Laboratory Access and Security 6](#_Toc29383157)

[2.3 Laboratory Door Signage 7](#_Toc29383158)

[3. Required Safety Training 8](#_Toc29383159)

[4. Hazard Identification 10](#_Toc29383160)

[4.1 Equipment Hazards 11](#_Toc29383161)

[4.2 Chemical hazards 11](#_Toc29383162)

[4.3 Compressed or Liquid gas 12](#_Toc29383163)

[4.4 Ionizing and Non-Ionizing Radiation 13](#_Toc29383164)

[4.5 Biological Materials 13](#_Toc29383165)

[5. Work Practices 14](#_Toc29383166)

[5.1 General Laboratory Rules 14](#_Toc29383167)

[5.2 Additional laboratory Work Practices 14](#_Toc29383168)

[6. Personal Protective Clothing and Equipment (PPE) 14](#_Toc29383169)

[6.1 Laboratory Footwear 14](#_Toc29383170)

[6.2 Laboratory Coat 14](#_Toc29383171)

[6.3 Eye Protection 15](#_Toc29383172)

[6.4 Gloves 15](#_Toc29383173)

[7. Hazardous Waste Disposal 15](#_Toc29383174)

[7.1 Chemical Waste 16](#_Toc29383175)

[7.1.1 Satellite Accumulation Area 16](#_Toc29383176)

[7.2 Biological Wastes 16](#_Toc29383177)

[7.3 Radioactive Wastes 16](#_Toc29383178)

[8. Laboratory Emergency Response 16](#_Toc29383179)

[8.1 911 Notifications 16](#_Toc29383180)

[8.2 Fire 16](#_Toc29383181)

[8.2.1 If you discovery a fire or smoke 16](#_Toc29383182)

[8.2.2 On hearing fire alarm 17](#_Toc29383183)

[8.3 Medical Emergency 17](#_Toc29383184)

[8.3.1 First Aid Kit 17](#_Toc29383185)

[8.4 Chemical Spill 17](#_Toc29383186)

[8.4.1 Incidental Chemical Spills 17](#_Toc29383187)

[8.4.2 Major Chemical Spills 18](#_Toc29383188)

[8.4.3 Chemical Spill Kits 18](#_Toc29383189)

[Appendix A – Laboratory Floor Plan Example 19](#_Toc29383190)

[Appendix B – Instructions for Writing Laboratory Specific Standard Operating Procedures (SOPs) 20](#_Toc29383191)

[Appendix C – Laboratory Specific SOP Template 21](#_Toc29383192)

[Appendix D – Lab Safety Plan Training Form 24](#_Toc29383193)

# Introduction

This Safety Plan has been prepared for the Insert Laboratory Name Laboratory; it provides specific information and instructions relevant to the laboratory’s activities and the safe control of hazards resulting from these activities.

## KAUST Laboratory Safety Manual

The KAUST Laboratory Safety Manual serves as the general guide to lab safety at the University. It establishes basic safe operating guidelines and practices so that faculty, students and staff may carry out effective educational and research programs in a safe and healthy environment.

A copy of the KAUST Laboratory Safety Manual is located at: describe location in the Lab where the KAUST Lab Safety Manual will be kept. The KAUST Laboratory Safety Manual can be found on the webpage <https://hse.kaust.edu.sa/services/lab-safety>.

## Laboratory Safety Plan

Due to the diverse nature of work being conducted at the University, the Lab Safety Manual is not intended to all-inclusive. Each laboratory is unique and therefore requires its own “lab-specific” safety plan.

Each laboratory where there is a risk of health or physical hazards is required to have a written safety plan (Laboratory Safety Plan) to protect against hazards to personnel, property or the environment. This includes laboratories having hazardous materials (chemical, biological or radioactive), high-pressure, high-energy, Laser, X-Ray, or other significant mechanical or electrical hazards.

The Laboratory Safety Plan should outline the lab-specific practices and procedures (Standard Operating Procedures or SOPs), personal protective equipment, emergency procedures and other safety requirements to protect employees from the hazards they may encounter in the laboratory.

The Laboratory Safety Plan serves as the basis for training of all laboratory users. In order to ensure that the Plan remains current and up-to-date it should be regularly reviewed (no less than annually).

# Laboratory Description

Laboratory location(s):

|  |  |
| --- | --- |
| **Building** | **FLOC #** |
|  |  |
|  |  |

Appendix A provides an illustration of the laboratory floor plan, showing equipment arrangements, exits and location of emergency equipment, including:

* Fire Extinguishers
* Eyewash/Safety Showers
* Chemical Spill Kits
* First Aid Kits

A brief description of the laboratory is below:

Insert brief description of the lab’s purpose, function, activities, major equipment, etc.

## Key Safety Personnel

|  |  |  |
| --- | --- | --- |
| **Position** | **Name of Person** | **Phone Number** |
| Lab Manager | *Insert information* | *Insert information* |
| Lab Safety Representative | *Insert information* | *Insert information* |
| Alternate Lab Safety Representative | *Insert information* | *Insert information* |
| First Aider | *Insert information* | *Insert information* |
| Training records coordinator | *Insert information* | *Insert information* |
| Laser safety supervisor | *Insert information* | *Insert information* |

## Laboratory Access and Security

* The normal work hours of the Laboratory are shown below:

Insert Normal Lab Hours, M-F

**DEFINE NORMAL WORKING HOURS**

* The laboratory will be kept locked at all times when not in use.
* Access to the Laboratory is restricted to only persons on official University business. Casual visitors are not permitted inside the Laboratory without the permission of those responsible for operating the lab.
* Children under the age of 16 are not permitted inside the laboratory unless they are there for a University-sanctioned activity (tour, open-house, etc.) and authorized by the Center Director or PI.
* Access to the Laboratory during off-hours or on weekends is permitted only with prior approval of the Center Director or Principal Investigator. It is recommended that all persons working in the Laboratory during off-hours must sign the visitor log. The location of where the visitor log book is kept is:

Describe where Log book is kept.

* If hazardous operations are being conducted as per the KAUST Laboratory Safety Manual – working alone policy - or as identified by the principal investigator, then a “buddy system” will be followed.
* All personnel are expected to comply with posted door signage warnings (see Section 2.3) and personal protective equipment (PPE) requirements.
* Individuals working within the Laboratory are required to meet the minimum training/competency requirements (see Section 3) prior to starting work.
* Where access to non-lab staff is required for the purposes of maintenance or cleaning, this will only be provided to persons that have:
* Undertaken the Contractor/Maintenance Laboratory Site Training.
* Been provided with appropriate personal protective clothing and equipment.
* It is recommended that supplies of highly hazardous chemicals, stocks of biological agents and radioactive materials must be kept locked and secured when they are not under the direct control of lab personnel.
* Any unauthorized entry into the lab should be reported to security immediately.

## Laboratory Door Signage

All entrances into the Lab shall be marked to indicate the presence of hazardous materials, any personal protective equipment requirements, and the name and phone numbers of key contacts.

The Laboratory Door Signage program can be accessed via the [Salute Portal](https://ehs.salutesafety.com/users/sign_in). All labs must maintain up to date lab door signage and revise them whenever key personnel or hazards found in the lab changes significantly or new hazards are introduced.

# Required Safety Training

Individuals working inside the Laboratory are required to complete the following *S*afety Training classes (please note, all lab faculty, staff, and students are **required** to take Laboratory Safety Training, Emergency Incident Preparedness Training and Hazardous Waste Training, in addition to any other training(s) identified below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Required** | **Training Subject** | **Required** | **Training Subject** |
|  | Laboratory Safety |  | Cold Bath Preparation |
|  | Hazardous Waste |  | Faculty Health and Safety Responsibilities Training |
|  | Emergency Incident Preparedness |  | Electrical Safety |
|  | Biological Safety Cabinet |  | Field Research Program |
|  | Biosafety |  | Fume Hood Safety |
|  | Bloodborne Pathogens Safety for the Lab Workers |  | Handling Glassware Safety |
|  | Compressed Gas Safety |  | Lab Equipment Safety |
|  | Flammable Liquid Safety |  | Laboratory Inspections |
|  | Hydrofluoric Acid |  | Noise Awareness |
|  | Interpreting Safety Data Sheets |  | Pressurized Vessels in Research |
|  | Liquid Nitrogen and Cryogenic Safety |  | Respiratory Protection |
|  | Nanomaterial Training |  | Standard Operating Procedure |
|  | Particularly Hazardous Substances |  | Working in Hot Climate Heat Illness Prevention |
|  | Peroxide Testing |  | Laboratory Safety Representative Orientation |
|  | Working With Reactive Chemicals |  | Laser Safety |
|  | Chemical Safety I\* |  | Laser Safety Awareness |
|  | Chemical Safety II |  | Ergonomic Awareness |
|  | Chemical Spills |  | Magnet Safety |
|  | Incident Reporting |  | Microwave Oven Safety |
|  | Emergency First Aid at Work |  | Radioactive Material Safety |
|  | Fire Safety |  | SEM and TEM |
|  | First Aid at Work |  | UV Safety |
|  | 3D Printer Safety |  | X-Ray Analysis Equipment Safety |
|  | Corrosive Materials Safety Training |  | Other |

\* Chemical Safety I training covers chemical safety and in addition it covers the following trainings: chemical storage and segregation, flammable liquids, corrosive materials, HF, particularly hazardous substances, peroxides, interpreting safety data sheets, and nanomaterials (if you complete Chemical Safety I, you will also receive the certificate for the other trainings covered).

In addition to the above listed safety training, individuals in the lab are required to complete lab-specific safety training as well. Individuals must be thoroughly familiar with specific Standard Operation Procedures (SOPs) for hazardous lab operations. Refer to Section 4 - Hazard Identification.

All persons potentially impacted by the hazard are required to know and understand the required safety control measures. Documentation shall be maintained to demonstrate that affected personnel have reviewed the SOP and agree to follow the recommended control measures.

The individual responsible for ensuring that the Lab’s training records are properly maintained and up-to-date is: Insert Name of Individual Here

# Hazard Identification

This section identifies the different work activities that occur in the lab and the potential hazards associated with these activities.

It is the responsibility of the Center Director or Principal Investigator to have suitable controls in place for anticipated hazards. It is required that written Standard Operating Procedures (SOPs) be developed by the lab to describe work methods and control measures necessary for the safe conduct of work.

*A template for preparing Lab Specific Standard Operating Procedures is presented in Appendix B.*

Safety Guidance Documents have been developed to assist lab personnel in the preparation of lab specific SOPs. Lab personnel have the option of adopting the recommended controls as written or they may modify or tailor the control methods to best fit the requirements of their individual laboratory.

In the tables below you will find common laboratory activities as well as the hazards usually associated with these activities. For each listed activity-related hazard, recommended guidance documents are provided (hyperlink in Column D). The recommended guidance documents can also be found on the lab safety webpage: <https://hse.kaust.edu.sa/services/lab-safety>.

The Health, Safety, and Environmental Department is responsible for the review and approval of each Lab Safety Plan and will pay particular attention to the SOPs developed for each hazard.

## Equipment Hazards

**A mark in column (B) signals the presence of this high hazard lab activity.**

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)**  **This activity is performed in the Lab** | **(B)**  **Yes**  (Click to check) | **(C)**  **Hazard** | **(D)**  **Recommended**  **guidance documents**  (Ctrl + Click to follow link) |
| Work with electrical equipment. |  | Shock, electrocution | [E1-Guidelines for Working with Electrical Equipment](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_electrical_equipment.docx?sfvrsn=337141c_2) |
| Work around strong magnetic fields or NMR. |  | Damage due to metal objects, low oxygen due to quench | [E2-Guidelines for Working Around Strong Magnetic Fields or NMR Instruments](https://hse.kaust.edu.sa/docs/default-source/research-safety/guidelines_working_with_magnets_v2_2020.pdf?sfvrsn=b664ced5_0) |
| Work with high pressure or vacuum apparatus. |  | Implosion/explosion | [E3 - Guidelines for Working with High Pressure and Vacuum Apparatus](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_pressure_and_vacuum.docx?sfvrsn=3ce8a6db_2) |
| Work with solvent distillation apparatus. |  | Fire, explosion, chemical release | [E4-Guidelines for Working with Solvent Stills](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_solvent_stills.docx?sfvrsn=c86ba956_2) |
| Work with glassware. |  | Laceration, eye injury | [E5-Guidelines for Working with Glassware](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_glassware.docx?sfvrsn=386109c0_2) |
| Work with autoclave. |  | Burn, excess pressure | [E6-Guidelines for Using An Autoclave](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_autoclaves.docx?sfvrsn=f5d5503e_2) |
| Work with hot oil bath/other heating sources |  | Burn, fire, explosion | [E7-Guidelines for Working with Hot Oil Baths and Other Heating Sources](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_oil_baths_and_heating_sources.docx?sfvrsn=7a43b7cc_2) |
| Work with 3D printers |  | Powders, resins, emissions, electric shock, mechanical injuries, thermal, UV/laser light | [E8-Safety Guidelines for Working with 3D Printers](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_working_with_3d_printers.pdf?sfvrsn=7ec67da4_2) |

## Chemical Hazards

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)**  **This activity is performed in the Lab** | **(B)**  **Yes**  (Click to check) | **(C)**  **Hazard** | **(D)**  **Recommended**  **guidance documents**  (Ctrl + Click to follow link) |
| Use highly corrosive chemicals |  | Chemical burn, reaction | [C1 - Guidelines for Working with Corrosives](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_corrosives.docx?sfvrsn=bf2dfcc6_2) |
| Use hydrofluoric acid. |  | Burn, poison. | [C2-Guidelines for Working with Hydrofluoric Acid (HF)](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_hydrofluoric_acid.docx?sfvrsn=65cfc71d_2) |
| Use mercury or mercury compounds |  | Poison | [C3-Guidelines for Working with Mercury](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_mercury.docx?sfvrsn=47e52b4e_2) |
| Use highly toxic chemicals |  | Poison | [C4-Guidelines for Working with Toxic and Highly Toxics](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_toxics.docx?sfvrsn=2801f823_2) |
| Use highly flammable liquids |  | Fire, explosion | [C5-Guidelines for Working with Flammable and Combustible Liquids](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_flammables.docx?sfvrsn=7f2433bf_2) |
| Use pyrophoric and water reactive chemicals. |  | Fire, explosion | [C6-Guidelines for Working with Pyrophoric and Water Reactive Chemicals](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_reactives.docx?sfvrsn=4454a242_2) |
| Use explosive or highly reactive chemical(s) |  | Explosion, Fire | [C7-Guidelines for Working with Explosive or Highly Reactive](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_explosives.docx?sfvrsn=522e228a_2) |
| Use oxidizing agent(s) |  | Fire, explosion | [C8-Guidelines for Working with Oxidizers](https://hse.kaust.edu.sa/docs/default-source/trainingdoc/guidelines_for_oxidizers.docx?sfvrsn=d9e813d6_2) |
| Use perchloric acid |  | Fire, explosion | [C9-Guidelines for Working with Perchloric Acid](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_perchloric_acid.docx?sfvrsn=8e988749_2) |
| Use Nanomaterials |  | Health Hazards, Fires | [C10-Guidelines for Working with Nanomaterials](https://hse.kaust.edu.sa/docs/default-source/research-safety/guidelines_for_working_with_nanomaterials.docx?sfvrsn=e00842c9_2) |
| Housekeeping and labelling containers |  | General | [C11-Guidelines for Good Housekeeping and Labelling Containers](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_good_housekeeping_and_labelling.docx?sfvrsn=faaefa3d_2) |
| Perform Lead Decontamination |  | Lead Exposure | [C12-Guidelines for Lead Decontamination](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_lead_decontamination.docx?sfvrsn=2acccee9_2) |
| Perform Potentially Explosive Experiments |  | Explosion, fire | [C13-Guidelines for Potentially Explosive Experiments](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_potential_explosive_experiments.docx?sfvrsn=cfbec2c2_2) |
| Perform Scale-up Reactions |  | Explosion, fire | C14-Guidelines for Scale-up Reaction |

## Compressed or Liquid Gas

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)**  **This activity is performed in the Lab** | **(B)**  **Yes**  (Click to check) | **(C)**  **Hazard** | **(D)**  **Recommended**  **guidance documents**  (Ctrl + Click to follow link) |
| Use Compressed Gas(es) |  | Pressure hazards, poison, fire, explosion, etc. | [KAUST Compressed Gas Safety Program](https://hse.kaust.edu.sa/docs/default-source/research-safety/compressed_gas_safety_program_feb_2022.pdf?sfvrsn=fe42182b_0) |
| Use Cryogenic Liquids |  | Asphyxiation, cold burn | [CG2-Guidelines for Working with Cryogens](https://hse.kaust.edu.sa/docs/default-source/service/sops/guidelines_for_cryogens.docx?sfvrsn=f8e21292_2) |
| KAUST Compressed Gas Safety Program |  | Any compressed gas work | [KAUST Compressed Gas Safety Program](https://hse.kaust.edu.sa/docs/default-source/research-safety/compressed_gas_safety_program_feb_2022.pdf?sfvrsn=fe42182b_0) |

## Ionizing and Non-Ionizing Radiation

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)**  **This activity is performed in the Lab** | **(B)**  **Yes**  (Click to check) | **(C)**  **Hazard** | **(D)**  **Recommended**  **guidance documents**  (Ctrl + Click to follow link) |
| Use unsealed radioisotopes  Isotopes used:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Max activity:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | Contamination, radiation exposure | [Ionizing Radiation Safety](https://hse.kaust.edu.sa/services/ionizing-radiation-safety) |
| Use sealed radioactive source  Isotopes used: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Max activity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | Contamination, radiation exposure | [[Ionizing Radiation Safety](https://hse.kaust.edu.sa/services/ionizing-radiation-safety)](https://policy.kaust.edu.sa/Community%20Policies/Health%20Safety%20and%20Environment/Health%20Safety%20and%20Environment%20Procedures,%20Processes%20and%20Programs/Radiation%20Safety%20Manual.pdf) |
| Use radiation generating equipment  Identify Radiation Producing Equipment:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Source:\_\_\_\_\_\_\_\_\_\_ Activity:\_\_\_\_\_\_\_\_\_ |  | Radiation exposure | [Ionizing Radiation Safety](https://hse.kaust.edu.sa/services/ionizing-radiation-safety) |
| Use lasers - Class 1 to 3R |  | Eye injury, skin burns | [Laser Safety and Non-ionizing Radiation Safety](https://hse.kaust.edu.sa/services/laser-safety-and-non-ionizing-radiation-safety) |
| Use lasers - Class 3B and/or 4 |  | Eye injury, skin burns | [Laser Safety and Non-ionizing Radiation Safety](https://hse.kaust.edu.sa/services/laser-safety-and-non-ionizing-radiation-safety) |
| Use Ultra Violet light sources |  | Eye and skin burns | [Laser Safety and Non-ionizing Radiation Safety](https://hse.kaust.edu.sa/services/laser-safety-and-non-ionizing-radiation-safety) |

## Biological Materials

|  |  |  |  |
| --- | --- | --- | --- |
| **(A)**  **This activity is performed in the Lab** | **(B)**  **Yes**  (Click to check) | **(C)**  **Hazard** | **(D)**  **Recommended**  **guidance documents** |
| Use BSL-1, BSL-2 microorganisms |  | Infection of personnel | [Biosafety](https://hse.kaust.edu.sa/services/biosafety) |
| Use rDNA or genetically modified agents |  | Release to environment | [Biosafety](https://hse.kaust.edu.sa/services/biosafety) |
| Use human sourced materials (blood, fluids, tissue, cell lines) |  | Infection of personnel | [Biosafety](https://hse.kaust.edu.sa/services/biosafety) |
| Use of Plants |  | Release to Environment | [Biosafety](https://hse.kaust.edu.sa/services/biosafety) |

# Work Practices

## General Laboratory Rules

The following work practices apply to all personnel who use or enter this laboratory. This includes all visitors, cleaners and maintenance staff:

All personnel entering the lab must wear proper personnel protective equipment as identified in Section 6, in the laboratory SOPs, and as determined by the Center Director or Principal Investigator.

Do not bring food or drink for consumption into the laboratory or store it in laboratory refrigerators. Eating, drinking, smoking and applying cosmetics are prohibited in the laboratory.

Report any hazards, faults, incidents and injuries to the Center Director or Principal Investigator immediately using the online Reporting System.

Follow the Standard Operating Procedures (SOPs) for the laboratory and incorporate the guidelines and safe practices outlined in the KAUST Lab Safety Manual into everyday practice.

## Additional laboratory Work Practices

The lab has developed specific Standard Operating Procedures (SOPs) where additional work practices are needed to work safely. Everyone in the lab is responsible for reviewing these SOPs and working in accordance with these requirements.

# Personal Protective Clothing and Equipment (PPE)

Appropriate personal protective equipment (PPE) is to be worn by all persons working in the laboratory. Personal protective equipment will be provided by the University at no cost to employees. [Personal Protective Equipment (PPE) Standard for KAUST Laboratories](https://hse.kaust.edu.sa/docs/default-source/research-safety/ppe_standard_for_kaust_laboratories.pdf?sfvrsn=af306acd_2) can be found on the lab safety webpage: <https://hse.kaust.edu.sa/services/lab-safety>. The Research Safety Team also has the [PPE Risk Assessment Tool](https://hse.kaust.edu.sa/services/ppe-riskassessment-tool) available for making PPE determinations based on the hazards present.

## Laboratory Footwear

It is University Policy that open–toed shoes are prohibited in the laboratory. Sandals, flip-flops, and bare feet are not allowed at any time.

## Laboratory Coat

Each person carrying out work in this laboratory will be issued with a laboratory coat. Laboratory coats shall:

* Be worn at all times while working inside the laboratory.
* Be removed **before** leaving the laboratory.
* Be laundered regularly and when contamination is suspected.

Laboratory coats may not be brought home to launder. Laundry arrangements for laboratory coats are arranged by the University.

## Eye Protection

Each person carrying out work in the laboratory will be issued with a pair of safety glasses. Over-glasses will be provided to those who wear prescription spectacles. Prescription safety glasses are also available for purchase, see PPE Risk Assessment Tool.

* Safety glasses provide impact protection – they do not provide protection from spills and splashes. Standard eyeglasses shall not be worn as a replacement for safety glasses. Safety glasses designed to fit over standard eyeglasses are available at the Chemical Warehouse.
* Additional eye protection (face shield, chemical splash goggles, etc.) must be used when there is risk of injury due to splash or spray of corrosive or toxic liquids, cryogenic or hot liquids, steam or high pressure, dusts, UV, or other anticipated hazards.
* Contact lenses may be worn in the laboratory, but do not offer any protection from chemical contact.
* Safety glasses must be worn even when contact lenses or standard eyeglasses are being worn.

## Gloves

Gloves shall be worn to protect you from the following hazards inside the laboratory:

|  |  |
| --- | --- |
| Hazards Requiring Glove Use | YES  Click |
| Chemical Contact |  |
| Biological Material Contact |  |
| Radioactive Material Contact |  |
| Heat or Steam |  |
| Cryogenic Liquids |  |
| Mechanical Hazards (Cuts, Lacerations) |  |
| Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |

Some key points:

* Be sure to select the right type of glove for the chemical you are working with. Consult the glove company’s glove chart to be sure you have the correct glove or contact HSE at [HSE@kaust.edu.sa](mailto:HSE@kaust.edu.sa) for more assistance.
* Gloves must be changed regularly. Wash your hands between glove changes and before leaving the laboratory.
* Gloves must be changed whenever contaminated.
* Gloves must be removed before leaving the laboratory, before using the computer or before answering the telephone, opening a door, etc.
* Due to allergy concerns, latex gloves should not be worn unless it can be demonstrated that they provide distinct advantage over other glove types.

# Hazardous Waste Disposal

Listed below is a general description of the different hazardous wastes (chemical, biological, radioactive) generated by the laboratory. Additional information can be found in the KAUST Hazardous Waste Manual on the lab safety webpage: <https://hse.kaust.edu.sa/services/lab-safety>.

## Chemical Waste

List chemical waste(s) to be generated:

### Satellite Accumulation Area

A Satellite Accumulation Area has been designated in our laboratory. The Satellite Accumulation Area is the area where our hazardous chemical wastes are stored for pick-up. The Satellite Accumulation area must be at or near the point of generation and under the control of the laboratory. Hazardous wastes must be identified using KAUST hazardous waste tags. The location of the Satellite Accumulation Areas in our laboratory is given below:

Describe location of Satellite Accumulation Area(s).

## Biological Wastes

List types of biological waste to be generated

## Radioactive Wastes

List radioactive waste(s) that will be generated.

# Laboratory Emergency Response

For any emergency, including fires, chemical spills, injuries, accidents, explosions, and medical emergencies, dial 911 from any University phone, including blue-light phones located in common areas throughout campus. If a University phone is unavailable or inaccessible during an emergency, dial 012-808-0911 from a mobile phone.  The 911 Dispatch Center will send appropriate responders (Fire, Security, and Medical) to the needed location.

## 911 Notifications

* Dial 911 from KAUST landlines or 012-808-0911 from mobile phones for all emergencies.
* Give the location of the event as clearly as possible.
* Indicate if ambulance is needed.
* Specify location where ambulance attendants, fire fighters or security will be met by the caller.

Do not hang up the phone until told to do so.

## Fire

University policy is such that individuals are not required to fight fires, but that those who choose to do so may fight small, incipient stage fires (no bigger than a wastepaper basket) as long as they have been trained in the proper use of fire extinguishers.

If you have been trained in the use of a fire extinguisher, fight the fire from a position where you can escape, and only if you are confident that you will be successful.

### If you discovery a fire or smoke

* Sound the alarm by pulling the nearest fire alarm pull station or warn others by verbal means. The pull station(s) closest to our laboratory are located:
* Describe Nearest Fire Alarm Pull Stations
* Call 911 from KAUST landlines or 012-808-0911 from mobile phone.
* Evacuate the building using the nearest exit and make your way to the designated assembly point.
* Close doors behind you.
* Do not re-enter the building until you have been told it is safe to do so.

### On hearing fire alarm

* Leave the building by nearest available exit.
* Close all doors behind you.
* Report to the designated assembly point.
* Do not re-enter until you have been told it is safe to do so.
* The assembly point for our laboratory is located:

Describe labs Evacuation Assembly Points. For your reference, Building Evacuation Plans are available at the Fire Services’ [webpage](https://hse.kaust.edu.sa/services/evacuation-plans).

## Medical Emergency

In the event of any injury or illness where medical assistance is needed, contact 911 from KAUST landline or 012-808-0911 from mobile phone. KAUST Emergency Medical Services will provide ambulance transport, if appropriate.

* Protect the victim from further injury or harm by removing any persistent threat to the victim or by removing the victim to a safe place if needed, however do not move the victim unnecessarily. Do not delay in obtaining trained medical assistance if it is safe to do so.
* Provide first aid until help arrives if you have appropriate training and equipment, and it is safe to do so.

Send someone outside to escort emergency responders to the appropriate location, if possible.

### First Aid Kit

A First Aid Kit is available to laboratory personnel. The nearest First Aid Kit for our laboratory is located:

Describe location of First Aid Kit

## Chemical Spill

When a chemical spill occurs, it is necessary to take prompt and appropriate action. The type of response to a spill will depend on the quantity of the chemical spilled and the severity of the hazards associated with the chemical. The first action to take is to alert others in the lab or work area that a spill has occurred. Then you must determine if the spill can be safely cleaned up by laboratory staff without the help of outside responders.

### Incidental Chemical Spills

A spill is considered incidental if the criteria below are met:

**Physical:**

* The spill is a small quantity of a known chemical.
* No gases or vapors are present that require respiratory protection.

**Equipment:**

* You have the materials and equipment needed to clean up the spill.
* You have the necessary proper personal protective (PPE) equipment available.

**Personal:**

* You understand the hazards posed by the spilled chemical.
* You know how to clean up the spill.
* You feel comfortable cleaning up the spill.

### Major Chemical Spills

A major spill is any chemical spill for which the researcher determines they need outside assistance to safely clean up a spill.

*If you have any doubts about your ability to clean up a chemical spill safely, then call 911. Trained spill responders are available 24 hours a day, 7 days a week.*

Actions to be taken when a major spill occurs:

* Alert people in the immediate area of the spill and evacuate the room.
* If an explosion hazard is present, do not unplug, or turn electrical equipment on or off – doing so can result in a spark and ignition source.
* Confine the hazard by closing doors as you leave the room.
* Use eyewash or safety showers as needed to rinse spilled chemicals off people or yourself.
* Evacuate any nearby rooms that may be affected. If the hazard will affect the entire building, then evacuate the entire building by pulling the fire alarm.
* Notify the Fire Department by calling 911 or 012-808-0911 from a cell phone. Always call from a safe location.
* Make Safety Data Sheet (SDS) for spilled material available to responders.

### Chemical Spill Kits

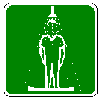
For emergency purposes, a chemical spill kit is maintained in the following location(s)

In the laboratory:

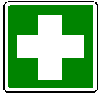
Describe location of Chemical Spill Kit

Appendix A – Laboratory Floor Plan Example

Laboratory:



40C Cold room



Autoclave

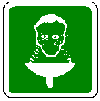
-800C Freezer

Class II BSC

Hand washing sink

Fume Hood

Laboratory Coat Hooks



-200C Freezer

Documents Cabinet

CO2 Gas Cylinders

CO2 Incubator

Emergency

Exit Only



Arrows indicate emergency exit from the laboratory



Appendix B – Instructions for Writing Laboratory Specific Standard Operating Procedures (SOPs)

**What is a Standard Operating Procedure (SOP)?**

A Standard Operating Procedure (SOP) is a written instruction that describes work methods and required control measures for conducting a specific procedure, operation or process.

**What is the purpose of an SOP?**

The purpose of an SOP is to provide written documentation of the various laboratory-specific work methods, operations or processes that are conducted within the lab. The development and use of SOP’s promotes more thorough and consistent application of needed safety control measures. SOP’s also help to assure conformance to good laboratory practices, reduce work error, and improve data comparability, credibility, and defensibility.

**What situations require a written SOP?**

Written SOPs should be developed for all routine or repetitive activities, processes, operations where there is *potential hazard to lab personnel*. Some examples of lab activities where SOPs are needed include:

* Working with electrical equipment.
* Working with high pressure or vacuum apparatus
* Operating an autoclave.
* Operating solvent distillation equipment.
* Handling hazardous chemicals (flammable, oxidizer, highly toxic, reactive, etc.)
* Working with compressed gases or cryogenic liquids.
* Using unsealed radioactive materials (32P, 14C, 3H, etc.).
* Working with Class IIIB, IV lasers.

**Who should write an SOP?**

SOPs should be written by laboratory personnel who are knowledgeable with the procedure, analysis or operation. These individuals are essentially subject-matter experts who actually perform the work or use the process. A team approach can also be followed, especially for multi-tasked processes where the experiences of a number of individuals are critical.

Appendix C – Laboratory Specific SOP Template

Name of Procedure: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SOP Prepared By: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Brief description of process, operation, activity**:

**Location:** This procedure may be performed at the following location(s):

**Hazards:** Briefly describe possible hazards associated with this procedure. This includes chemical hazards, physical hazards, equipment related hazards, etc.

**Engineering Controls:** Prior to performing this procedure, the following safety equipment must be available, functioning properly and ready to use.

|  |  |  |  |
| --- | --- | --- | --- |
|  | (Click if Yes) |  | (Click  if Yes) |
| Chemical Fume Hood |  | Biological Safety Cabinet |  |
| Glove Box |  | Laminar Flow Hood |  |
| Snorkel Device |  | Bench Top Dust Enclosure |  |
| Ventilated Gas Cabinet |  | Radiation Shielding |  |
| Flammable Gas Monitor |  | Toxic Gas Monitor |  |
| Safety Interlock |  | Low Level Oxygen Monitor |  |
| Safety Shower |  |  |  |
| Eyewash Station |  |  |  |
| Fire Extinguisher |  |  |  |
| Other (Describe) |  | | |

**Personal Protective Equipment (PPE):** The following personal protective equipment must be used while performing this procedure:

|  |  |  |  |
| --- | --- | --- | --- |
|  | (Click if Yes) |  | (Click if Yes) |
| Laboratory Coat |  | Chemical Apron |  |
| Safety Glasses |  | Chemical Splash Goggles |  |
| Full face Shield |  | Laser Goggles |  |
| Cryogenic Gloves |  | Heat Resistant Gloves |  |
| Disposable Gloves Type |  |  |  |
| Chemical Resistant Gloves (Describe Type)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| Respirator (Describe Type)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |

**Training Required:** The following training is required as part of the SOP:

|  |  |  |  |
| --- | --- | --- | --- |
|  | (Click if Yes) |  | (Click if Yes) |
| Chemical Spill Training |  | Laboratory Safety Training |  |
| Electrical Safety Training |  | Laser Safety Training Radiation Safety Training |  |
| Flammable Liquid Safety Training |  | Safe Fume Hood Use Training |  |
| Hazardous Waste Training |  | Safe Handling of Liquid Nitrogen |  |
| Hydrofluoric Acid Awareness Training |  |  |  |
| Other Training (Describe)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | |

**Emergency Procedures** (Briefly discuss the specific procedures to be followed if emergency situations arise from the process/procedure. Describe steps to take in case of accidental spill, splash, exposure, etc.)

**Waste Disposal** (Outline waste materials to be generated and appropriate waste management procedures for the work).

Appendix D – Lab Safety Plan Training Form

(This form should be completed and signed by each person working in the lab that is covered by this Lab Safety Plan and kept on file with the Principal Investigator. Print additional copies as needed.)

The following was discussed and understood during the lab specific safety training with the Center Director or Principal Investigator:

* The contents of this Lab Safety Plan.
* Individual responsibilities of all personnel in the lab.
* Required safety training.
* Locations and operation of the lab specific safety equipment (fire extinguishers, fire blankets, safety showers, eye wash).
* Lab Specific Standard Operating Procedures (SOPs) for hazardous operations and use of hazardous chemicals.
* How to handle emergency situations.
* How to report incidents, injuries, and near misses.

By signing below I certify that I reviewed and understood this Lab Safety Plan, met with the Center Director or Principal Investigator to discuss the items noted above, and had the opportunity to ask questions about any items that were unclear to me.

|  |  |  |  |
| --- | --- | --- | --- |
| **Print Name** | **KAUST ID** | **Signature** | **Date** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |