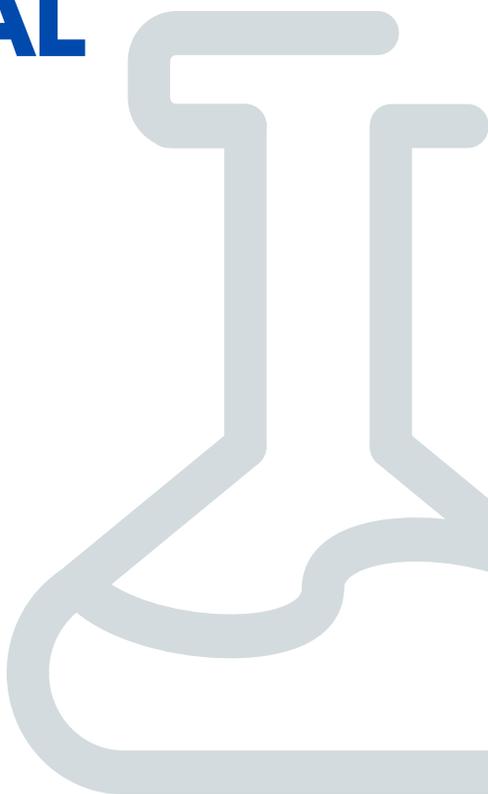




**UNIVERSITI
MALAYA**
Faculty of Medicine

CHEMICAL MANAGEMENT MANUAL

**2021
FIRST EDITION**



ACKNOWLEDGEMENTS

Special gratitude to the

Management of Faculty of Medicine, Universiti Malaya
Quality Management System Team, Faculty of Medicine, Universiti Malaya
OSHE unit, Faculty of Medicine, Universiti Malaya
Task Force (Chemical) Team, Faculty of Medicine, Universiti Malaya
Jawatankuasa Kesihatan dan Keselamatan Pekerjaan Peringkat Kecil (JKKPK),
Faculty of Medicine, Universiti Malaya

for the support towards the development of the FOM Chemical Management Manual.

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Published by:

Faculty of Medicine
University of Malaya
50603 Kuala Lumpur
Federal Territory of Kuala Lumpur
Tel.: (603) 79677509
Website address: <https://medicine.um.edu.my/>

First Edition, 2021

Also available from the National Library of Malaysia
ISBN : 978-967-26545-0-6
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A. SCOPE

This manual applies to all authorized personnel working in the Faculty of Medicine, Universiti Malaya

B. PURPOSE

To serve as a guidance document for personnel working with chemical and outline of the personal protection system for the laboratory to ensure compliance with all applicable local and international guideline requirements.

C. RESPONSIBILITIES

- i. Head of department/unit
- ii. Principal Investigator (PI)
- iii. Laboratory Manager
- iv. Employee
- v. Student
- vi. Research assistant; or
- vii. Any person that in charge of the operations must ensure that personnel working in his or her laboratory or area of responsibility are in compliance with the requirement.

Before beginning any activity with chemicals in laboratories, all workers must read and understand the contents of this document. They should receive the necessary safety training and be equipped with the necessary information, skills, and techniques to handle chemicals safely and without endangering their own or others' health and safety. When laboratory personnel expects or suspects exposure to specific harmful compounds, they must notify the OSHE unit at the Faculty of Medicine (OSHE FOM) for further investigation and mitigation measures.

D. SAFETY RELATED

Personnel who are exposed to chemicals must take the following precautions:

- i. All work processes are planned with standard operating procedures in mind and followed during execution (SOP).
- ii. When handling dangerous substances in the laboratory, personal protective equipment (PPE) is worn.
- iii. Adherence to proper safety procedures.
- iv. Reporting unsafe behaviours or procedures to the supervisor, principal investigator, or head of the department.

1. CHEMICAL PURCHASING

In the planning of ordering chemicals, staff and personnel should:

- 1.1. Verify that the chemical is listed in the laboratory chemical inventory list of permitted chemicals and that it complies with any facility regulations.
- 1.2. Personnel must be trained and capable of assessing chemical hazards.
- 1.3. Update the current inventory of existing chemicals (minimum every 3-months)
- 1.4. Consider the following:
 - i. Hazardous potential of the chemical
 - ii. Quantities of chemicals and use at the facility
 - iii. Research value of the chemical
 - iv. Degree to which the laboratory is equipped and prepared with the mitigation controls for the safe use of the chemical.
- 1.5. Prior purchasing, purchaser is required to fill in "Borang A Kewangan" with 'chemical purchase' remark under 'Other' column. Purchases that do not meet below requirements will be forwarded to the FOM Task Force (Chemical Safety) for further review and assessment. Requirements mentioned as follows;
 - i. Chemical listed in Schedule II in Occupational Safety and Health (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000, Prohibition Use of Substance Order 1999 & Poison Act 1952.
 - ii. Chemical in bulk quantity. (Usage: purchase quantity estimated ratio is 1: 4). Example: procedure(s) require 1 liter of Chemical X, a maximum quantity allowed to be purchased is 4 liters.
- 1.6. The department/unit will be responsible in disposing the waste of chemical, including cost and method of disposal for surplus purchases of chemical.

2. CONTROL OF HAZARDOUS CHEMICALS

Hazardous chemical control should follow the control hierarchy outlined below:

2.1. Elimination

Elimination is the process of removing chemical hazards from the workplace. It is the most effective method of risk control because the hazard is no longer there, and it should be applied whenever possible. Elimination examples include:

- i. Use Test Kit X to eliminate the need to mix chemicals.

2.2. Substitution

When a new chemical or substance is used in place of the original, it is known as

substitution. Substitution entails replacing a toxic chemical with a less dangerous one, utilising the same chemical in a less hazardous form, or using the same chemical in a less hazardous procedure.

Substitution can be in two forms:

- i. Material substitution
- ii. Procedure substitution

If both or more of these forms of substitution can be used, they may provide a way of control and an optimal result.

2.3. Enclosure and Isolation

These measures are designed to keep the chemical away from the worker and their surroundings. A worker is kept physically away from a specific hazard by an enclosure. For example, an enclosed equipment is sealed away and is typically 'opened' only for cleaning or maintenance. Isolation is the practice of eliminating the source of hazard exposure from the employees' surroundings, ensuring that the hazardous procedure is geographically away from the majority of the workers and therefore decreasing chemical exposure.

2.4. Engineering Control – Ventilation

Engineering controls are methods that are built into the design of a plant, equipment or process to minimize the hazard. If correctly developed, implemented, and maintained, engineering controls are a very dependable technique to control worker exposures. The following are the most common engineering controls:

2.4.1. Ventilation is a means of controlling air in the workplace by carefully adding and removing it. If properly designed, ventilation can remove or dilute an air pollution.

2.4.2. Types of Ventilation:

- i. General Ventilation (GV) - The diffusion of pollutants caused by air flow into or out of a work place. This is a ventilation system that mixes and dilutes pollutants in the workroom air using natural or manually generated fresh air movements. It's sufficient when the contaminants aren't harmful and the amount of contaminant produced is modest. However, it is not advised in the following circumstances:
 - a. to control highly toxic pollutants/contaminants
 - b. when there is a risk of fire or explosion close to the ignition source
 - c. when the worker is in close proximity to the source of the contaminant
 - d. when there is a chance that the contaminant will cause corrosion

- ii. Local Exhaust Ventilation (LEV) - Contaminants are collected near the source, away from the worker's breathing zone, and the containment is vented to the outside before entering the workroom air. The system is made up of hoods, ducts, a fan, and, occasionally, air cleaning equipment. However, the system must be built properly, with hoods that are properly made and positioned, as well as fans and ducting that are appropriately sized. It also has to be inspected and tested on a regular basis by a qualified Hygiene Technician 2 (HT2), as well as investigation on filter blockages and extraction system leaks.

LEV must be inspected for performance on a monthly basis by department officials in charge of the equipment. (Refer APPENDIX 1 for Fume Hood Monthly Checklist).

2.5. Administrative Control

Administrative controls are work practices that aim to restrict exposure in terms of direction, frequency, and severity. Administrative controls including:

2.5.1. Laboratory Personnel Responsibilities

Laboratory personnel that work involved in chemical handling must ensure that:

- i. All work procedures are designed and carried out in accordance with the in-house SOP.
- ii. Appropriate PPE must be worn when handling dangerous substances in the laboratory.
- iii. Adequate safety procedures should be informed and enforced.
- iv. Unsafe acts or practices must be reported to the supervisor/PI/Department Head to avoid occurrence of incident.

2.5.2. Training

All laboratory personnel who work with dangerous chemical should receive training in chemical safety. In reference to the Occupational Safety and Health (Use and Standards of Exposure of Chemical Hazardous to Health) Regulations 2000, It is the employer's responsibility to offer essential information, instructions, and training to employees who may be exposed or are likely to be exposed to hazardous chemicals in order to raise awareness and enable workers to take the necessary precautions to safeguard their safety and health.

Prior to operations, training must be undertaken to ensure that laboratory workers are properly taught and understand how to conduct themselves. This included processing and updating danger information on chemicals that are detrimental to one's health, standard operating procedures, or control measures, as well as assigning people to a new duty or work area. The following items

should be included in the training programmes, but not limited to:

- i. Laws and regulations that apply
- ii. Personal protective equipment
- iii. The chemical's impact on human health
- iv. Chemical Registry
- v. Chemical registry Labels and Safety Data Sheets: How to Read and Understand Them (SDS)
- vi. Cradle to grave : chemical handling
- vii. Chemical exposure monitoring
- viii. Risk assessment (HIRARC, CHRA)
- ix. Proper/safe use of equipment (e.g. fume hood)
- x. Emergency procedures
- xi. Medical surveillance and medical removal

2.5.3. Medical Surveillance Program

For workers exposed to 34 different types of chemicals, an appropriate medical surveillance programme is required. (Scheduled II) (*Refer APPENDIX 2 for Chemicals for which medical surveillance is appropriate*) mentioned in the Occupational Safety and Health (Use and Standards of Exposure of Chemical Hazardous to Health) Regulations 2000. Only registered occupational health doctors/medical officers are permitted to conduct medical surveillance.

- i. Medical surveillance entails taking a thorough medical and occupational history, a clinical examination, a visit to the workplace, and biological monitoring. Medical Surveillance is used to detect changes in workers' health caused by chemical exposure at work, as well as to diagnose, treat, and intervene early. For further details, refer to Guideline on Medical Surveillance, Under the Occupational Safety and Health (Use and Standard of Exposure of Chemicals Hazardous to Health) Regulations, 2000 P.U.(A)131.

2.5.4. Personal Protective Equipment (PPE)

Personal protective equipment (PPE) is equipment that is used or worn by personnel to protect them against occupational risks. Respirators, masks, eye protection, an apron, a body suit, and protective boots are examples of PPE for chemical exposure. It is the employees' duty to identify and use the appropriate PPE as recommended in the SDS.

- i. Selected to minimise risk to health and safety.
- ii. Fit for the nature of the work and any hazards that may be encountered.
- iii. A proper size and fit for the person wearing it.

Employee evaluations, issuances, and training records should be retained for either legal or programme evaluation purposes. (*Refer APPENDIX 3 for PPE Issuance Record Form*).

3. ACQUISITION / RECEIVING CHEMICAL

- 3.1. All laboratory staff involved in chemical procurement/receiving must be included in the chemical training programme. The purchase, transfer or use of any chemical in the laboratory must have prior approval from laboratory supervisor or PI.
- 3.2. Chemical containers must be complete and in excellent working order, with adequate label information such as substance name, appropriate hazard warning, and manufacturer or distributor identification. (Labelling complies to CLASS regulation 2013)
- 3.3. Receiver must ensure that the Safety Data Sheet (SDS) and/or certificate of analysis (CoA) upon receiving the chemicals. This should be specified in the e-procurement specification.
- 3.4. For all hazardous materials purchased, SDS should be provided. The SDS will then be filed in the laboratory, where it will be accessible to all laboratory workers throughout working hours.
- 3.5. Safety Data Sheets (SDS)

Chemical vendors and end users use SDS as their primary communication mechanism. All hazardous compounds listed in the register should have their SDS collected and compiled from their respective vendors. Sixteen (16) sections should be included in the SDS and the SDS must be in accordance to CLASS 2019 regulation. (*Refer APPENDIX 4 for SDS Sections*)

4. CHEMICAL REGISTER

The chemical registry can be used to identify chemicals that required special storage, handling and disposal. All hazardous substances that are manufactured, stored, utilised, or handled in the laboratory must be tracked. Complete the forms (*Refer APPENDIX 5 for Chemical Register Form*) in:

- i. Section A: Company Information
- ii. Section B: List of chemical hazardous to health form
- iii. Section C : Name of person who prepared or reviewed

The chemical register list:

- i. When chemicals are no longer utilised or new substances are added, the database should be updated.
- ii. All personnel who are exposed to or are likely to be exposed to hazardous chemicals at

- work must have access to this information.
- iii. Safety and health officers, chemical health risk assessors, firefighters and rescuers, and doctors who treat chemical poisoning patients will find it valuable.

It is compulsory for each laboratory to complete the Chemical Register form (updated every 6 months) and submit a copy to OSH FOM. Refer to (*Refer APPENDIX 6 for the Guideline to complete the Chemical Register form*).

5. CHEMICAL LABELLING

Under sub-regulation 8(1) of the CLASS regulations 2013, the supplier must provide the following information on every hazardous chemical container in a legible and indelible manner:

- 5.1. Product identifier: a name or number that appears on a label or in the SDS for a hazardous substance.
- 5.2. Supplier identification: On the label, the hazardous chemical supplier's name, address, and phone number must be included.
- 5.3. Signal word:
 - i. "Danger" and "Warning" are the signal words used in the Regulations.
 - ii. The more serious hazards are labelled "Danger," while the less serious are labelled "Warning." There must only be one signal word on the label. If the signal word "Danger" applies, the phrase "Warning" shall not appear on the label.
- 5.4. Hazard statement: As stated in the First Schedule of the Regulations, the type of hazardous chemical risks, including the degree of danger where appropriate, is defined.
- 5.5. Hazard pictogram (a symbol and a border).
 - i. The hazard pictogram must have a black symbol on a white background with a visible red border.
 - ii. All hazard pictograms on the label must be in the shape of a diamond, with the sides inclined 45 degrees to the horizontal. Refer to (*Refer APPENDIX 7 for hazard pictograms*)
- 5.6. Precautionary statement: highlights the precautions that should be taken to reduce or prevent the negative effects of hazardous chemical exposure.

Precautionary statement consists of:

 - i. **Statement of Caution**- to preventive measures to avoid an accident or exposure;
 - ii. **Statement of Response** - instructions in the event of a mishap;
 - iii. **Statement of Storage** - recommendations for the chemical's safe storage;
 - iv. **Statement of Disposal** - instructions for proper disposal

5.7. Labeling of Chemical Containers

- 5.7.1. All labels must carry the following information: (Refer APPENDIX 8A for label for in use chemical label).
- i. The full name of the chemical.
 - ii. Preparer's initials
 - iii. Date of preparation with 3 months expiry
 - iv. If the compound is not pure, the concentration and units must be specified.
 - v. The chemical hazard pictogram. Expect that the dilutions will provide the same risks as the concentrated substance.
- 5.7.2. When a chemical is transferred to a different container from the one in which it was originally delivered, laboratory workers must ensure that the container is relabeled. The container must be relabeled with the chemical name or trade name that was written on the original label.
- 5.7.3. For the purpose of this manual, "labelling" and "relabeling" means: in situation of a chemical hazardous to health, in accordance with the requirements of the Occupational Safety and Health (Classification, Packaging and Labelling of Hazardous Chemicals) Regulations 1997 [P. U. (A) 143/97]; in the case of a pesticide, in accordance with the requirements of the Pesticides Act 1974 [Act 149]; or in the case of a schedule waste, in accordance with the requirements of the Environmental Quality (Schedule Wastes) Regulations 1989 [P. U. (A) 139/89].

6. CHEMICAL INVENTORY

According to the following recommendations, all laboratories must continually monitor chemical inventory;

- i. When new hazardous substances are purchased, they must be included to the inventory as soon as possible.
- ii. Hazardous substances must be removed from the inventory, when they are used or disposed of.
- iii. The inventory must be reviewed and updated on a regular basis (minimum every 3 months)
- iv. Users should be able to access the inventory at any time.

(Refer APPENDIX 9 for Chemical Inventory Log Sheet form) - to be apply by chemical handler in the Faculty of Medicine, Universiti Malaya

7. CHEMICAL STORAGE

- 7.1. Many compounds have unique storage requirements due to their physicochemical characteristics. The dangers or risks associated with chemical storage include one or more of the following:
- Chemicals with substance(s) that, over time, develop unstable and may cause a fire or explosion
 - Chemical with temperature sensitive substance(s)
 - Chemicals transferred into unsuitable or labelled containers
 - Chemicals that are susceptible to shock
 - Compounds possessing a physical feature that renders them incompatible with other chemicals;
 - Storage requirements are determined by chemical licensing criteria or restrictions.
 - Damaged and leaking chemical packing
 - Chemical storage system that introduces additional chemical-related hazards
- 7.2. During the chemical risk evaluation, storage arrangements should be determined and appropriate provisions made. The SDS specifies the storage needs.
- 7.3. Chemicals should be stored according to their compatibility by those who use them. (*Refer APPENDIX 10 for Chemical Storage by Compatibility Chart*)
- 7.4. All of the chemicals used in a single room should be classified. The chemical must be segregated based on their chemical properties and compatibility with other chemicals before stored.
- Chemicals that are volatile should be kept in a vented cabinet.
 - Liquid chemicals should never be kept above the level of the eye.
 - Spill trays should be used for highly corrosive chemicals.
- 7.5. Evaluate the facilities and equipment in place for storing chemicals referring to the compatibility group information. If necessary, get more equipment and supplies for storing chemicals. The list of chemicals should be displayed in the storage area.
- 7.6. Laboratory Refrigerators
- Laboratory freezers used to hold flammable solvents or other volatile compounds can build up flammable or explosive atmospheres within. In these circumstances, ignition sources from the refrigerator could result in an explosion.
 - A suitable refrigerator *i.e.*, can eliminate ignition sources can be used to hold flammable chemicals.
 - Refrigerator temperature monitoring must be monitored and recorded.
 - Storage for toxic chemical: must be locked and limited access should be implemented.

7.7. Signage

- 7.7.1. A warning label noting that the area is a storage area for hazardous chemicals should be displayed at all chemical storage facility. (*Refer APPENDIX 11 for printable version of the Chemical Hazardous to Health notice that should be coloured and printed on white paper.*)
- 7.7.2. Chemical storage cabinets, lockers, cabinets, and refrigerators should all be adequately labelled with the type of chemicals being held.

7.8. Expiration date of chemical

The expiration date of chemical is the amount of time that a chemical should remain in use after opening and or the manufacturing date. It is an indicator in which a chemical may begin to decline in quality or stability which can lead to inaccurate results or unsafe use of the chemical. The expiration date will be written on the chemical container, or otherwise, based on the instruction by the manufacturer.

- 7.8.1. Chemical with expiration date on the original bottle.

Discard immediately after expiry date.

- 7.8.2. Chemical with no expiration date

The chemical can be use and store until five (5) years from manufacturing date. Upon receiving the product, assign a date 5 years from the opening date (opening date must not be more than one (1) year from the delivery order (DO) date) as the expiry date and document expiry date on the chemical registration inventory record document. In the condition of chemical showed any physical changes, the chemical must be disposed immediately.

- 7.8.3. Extension of expiry date:

- i. Maximum of five (5) years from expiry date, provided no physical and chemical changes observed.
- ii. Extensions are only permitted for use that is known not to jeopardise the safety of laboratory personnel, equipment performance, or data quality.
- iii. Beginning the expiry of the chemical, below documents must be provided to justify the expiry date extension of the expired chemical:
 - a. Consent form: Expired Chemical Storage (*Refer APPENDIX 12 for statement and declaration of responsibility, ownership of liability of expired chemical usage & storage-2 pages*).
 - b. In-house Chemical Performance Check Report (verified by FOM's registered chemist)
- iv. Throughout the storage and usage of expired chemical, below records must be available for audit trail purpose:
 - a. A monthly chemical visual inspection record (check for undamaged label, proper containment, physical state and colour-may refer to section 9 chemical SDS)

- b. Chemical usage log
 - v. Guideline for Conducting an In-House Chemical Performance Check Assay quality control (QC) material as per the applicable test method(s).
 - a. Two reports to verified against: fresh chemical as control and expired chemical as sample under test.
 - b. If the result is within acceptable limits and/or verification is acceptable by FOM registered chemist, therefore the chemical is acceptable for use. A minimum of once a year, a performance check should be carried out.
 - c. Use the registered chemist's approval date to document the verification date.
 - d. However, if the QC result showed that it is "Outside acceptable limits" therefore the QC test need to be repeated. If verification fails a second time, the chemical must be sent for disposal.
 - e. Tag the bottle with in house label (Refer APPENDIX 8B – label/tag for expired chemical)
 - vi. The following time-sensitive chemicals are not subject to an extension of their expiry date;
 - a. Peroxide Formers (e.g. diethyl ether, benzyl alcohol)
 - b. Polynitrated Aromatics (e.g. dinitrotoluene, nitroglycerin)
 - c. Shock-Sensitive Chemicals (e.g. picric acid, perchloric acid)
 - d. Chloroform
 - e. Anhydrous Hydroflouric Acid
- 7.8.4. The owner of the chemical will hold responsibility for any incidents caused by improper chemical usage and storage recommended by this manual.

8. CHEMICAL HANDLING

During the transfer of chemicals, there is a considerable risk of exposure to dangerous compounds. In the event of a chemical spill in the laboratory, hazardous amounts of vapour and gases can be released into the atmosphere, endangering the building's residents.

Procedures for Safe Chemical Handling:

- i. Identify the chemical in the work process
- ii. Comprehend the relevant SDS
- iii. Observe and comply the In- house Standard Operating Procedures (SOP)
- iv. Wear suitable PPE (Personal Protective Equipment).
- v. Ensure that the fume hood is operational.
- vi. Chemical waste should be disposed according to FOM's disposal procedure.
- vii. Before beginning work and after completion, chemical handler must ensure that the work

surface is clean.

8.1. Chemical Use

The following guidelines for chemical use should be observed at all times.

- i. Use the first-in, first-out (FIFO) method.
- ii. Before using, make sure to read the labels on the chemicals.
- iii. Keep SDS up to date by reviewing it on a regular basis for new information (minimum once a year).
- iv. Keep track of when the chemical was first opened.
- v. Never mix unknown compounds.
- vi. Chemicals should not be stored in food containers.
- vii. To avoid chemical inhalation of dust/fumes, use ventilation systems.
- viii. Hands are washed after working with chemicals

8.2. Correct use of Personal Protective Equipment (PPE) and its maintenance

- i. Consider probable exposure when choosing the right type and fit of PPE (use guidance from the SDS)
- ii. Workers should be given explicit instructions on how to PPE
- iii. Ascertain that the appropriate PPE is worn as directed.
- iv. When required, store, clean, and maintain personal protective equipment.
- v. PPE replacement should be planned and budgeted for at regular intervals
- vi. It is not permissible to utilise PPE that has passed its expiration date.

8.3. Maintenance and Housekeeping

- 8.3.1. Determine and record which chemical containers are present in the laboratory with following condition;
 - i. Unlabeled or improper labelling
 - ii. In poor state
 - iii. Expired
 - iv. No longer required
- 8.3.2. Chemicals that meet one or more of these criteria are candidates for disposal. The amount of chemical utilised each year, as well as available amounts and/or volume of chemical in hand, are used to assess if disposal is appropriate.
- 8.3.3. Throughout the transfer of chemical substances, the right chemical name must be precisely labelled.
- 8.3.4. Personnel must wear the proper PPE when transporting chemicals.

9. CHEMICAL WASTE HANDLING

A detailed procedure on chemical waste handling refer FOM OSHE Standard Operating Procedure: Transportation of Chemical Waste.

During the transfer of chemicals, there is a considerable risk of exposure to dangerous compounds. Chemical spillage occurring in the laboratory can lead to the release of hazardous concentrations of vapour and gases into the atmosphere affecting the building occupants.

9.1. Waste labelling

- 9.1.1. Waste containers must be identified when waste begins to accumulate, not when it is full. The SDS for the chemicals/reagents must be accessible if you're using a commercial name.
- 9.1.2. When reaction residues are removed from the experimental apparatus, they are considered as waste. It is advisable to determine each constituent's concentration.
- 9.1.3. The following information must be included on the garbage container:
 - i. Chemical name, or mixture components
 - ii. Name, department and contact number
 - iii. Dangerous goods Class label (when applicable)
 - iv. Disposal type (acid, base, organic solvent)
 - v. Quantity in volume or weight
 - vi. Waste Code
 - vii. Date generated

9.2. Waste segregation and storage

- 9.2.1. Before being transferred for disposal, chemical wastes must be sorted into proper waste bottles or containers. Proper waste segregation will allow for maximal treatment and recovery while also preventing incidents caused by inappropriate segregation.
- 9.2.2. Create a separate location with suitable signage for waste and working reagents/chemicals.
- 9.2.3. Distinct incompatible wastes using separate storage arrangements, such as independent secondary containers. (Refer 4th Schedule, Scheduled Waste Regulation, Environmental Quality Act, 2005).
- 9.2.4. Determine the physical and chemical qualities that may have an impact on disposal options. In a waste container, never mix incompatible wastes.
- 9.2.5. The waste container must be suitable for the contents. Even if the bottle has been washed, do not pour chemical waste that is incompatible with previous chemicals

that have been stored in that bottle.

- 9.2.6. Separate harmful aqueous waste from waste organic solvent. Only non-hazardous inorganic aqueous waste (e.g. sodium chloride aqueous solution) is permitted to be poured down the sink, in the absence of any biological constituent.
- i. Segregate the following waste and packed it away from each other;
 - a. bases from acids
 - b. flammable organics from oxidizers
 - c. salts from heavy metal solutions
 - d. health-toxic chemicals (e.g. carcinogens, cyanides)
 - e. a chemical that produces peroxide from combustion materials and mineral acids
 - f. water-reactive chemicals (e.g. Sodium metal)
 - ii. Collect chemically contaminated solid waste and broken glass in sharp bin
- 9.2.7. Containers for waste should be compatible with the contents. Even if the bottle has been washed and cleaned, do not pour chemical waste that is incompatible with previous chemicals that have been stored in that bottle.
- 9.2.8. When transporting chemical waste into a container, use Local Exhaust Ventilation (LEV).
- 9.2.9. Except when adding new waste, waste containers must be kept closed. Open containers can cause hazardous chemicals to be released into the atmosphere as vapour, aerosol, or gases. It also raises the likelihood of leakage.
- 9.2.10. Before being discarded, solid biological specimens should be separated from the chemical.
- 9.2.11. To allow for expansion, leave a ten percent head space. Do not overfill waste containers.
- 9.2.12. Use suitable personal protection equipment when handling chemical waste. (As recommended in Section 8 of SDS).
- 9.3. Storage and disposal
- 9.3.1. Chemical wastes are collected in a dedicated or separate place for disposal, including segregation and packaging. Prior to pick-up, the storage room should be clearly identified and secured.
- 9.3.2. Waste containers should never be placed in common areas such as corridors, or near floor drainage points.
- 9.3.3. It is advisable, all wastes are contained in secondary container while in storage.
- 9.3.4. The waste collection will be scheduled every 3 months and the officer in charge from Department of Development and Estate Maintenance (JPPHB) will make proper arrangement of the collection process.
- 9.3.5. All laboratory managers will be informed prior to the collection and FOM OSHE

unit will ensure that the chemical waste collection and disposal process to be completed.

9.4. Record of chemical waste

All records must be kept in accordance with the *FOM OSHE Standard Operating: Transportation of Chemical Waste*.

10. EMERGENCY PROCEDURE

- 10.1. The emergency process is established in line with any authority-imposed (national and international) requirements or as determined by an examination of the risks and events that may occur as a result of the use of hazardous chemicals at work.
- 10.2. Laboratory work procedures should be kept up to date with new or updated information from SDS, work activity, arrangements, and chemical hazard risk assessment.
- 10.3. If an occurrence occurs outside the establishment where the operational activity takes place, local authorities may be required to interfere.
- 10.4. It is necessary to create and implement emergency protocols.
 - i. The chemical's physical characteristics, such as fire and explosion hazards, environmental damage, and the likely health effects of exposure (refer chemical's SDS)
 - ii. The chemical's full life cycle and intended application, from cradle to grave.
- 10.5. During the risk evaluation process, the following emergency procedures should be determined:
 - i. A firefighting media that is suitable for the chemical's physical qualities
 - ii. General first aid requirements and appropriately trained first aiders
 - iii. Some substances may necessitate specific first-aid procedures
 - iv. Spill kits that are acceptable for the chemical's physicochemical properties
 - v. Supplementary equipment to mitigate or reduce the influence on the environment
 - vi. Emergency showers and eyewash stations, as well as their placement and accessibility
 - vii. the necessity of a self-contained breathing equipment and environmental monitoring instrument.
- 10.6. Determine if a chemical spill is minor or major in the event of a spill. For minor spills, self-treatment is adequate. However, a major spill necessitates a premise evacuation as well as exterior remediation. (*Refer APPENDIX 13 for further chemical spillage treatment procedures*).

11. COMPLIANCES

All personnel need to adhere and comply with respective legislation listed in APPENDIX 14

APPENDIX 1



FUME HOOD MONTHLY CHECKLIST
(SENYARAI SEMAK BULANAN KEBUK W/ASAP)

TAHUN:
(Year) _____

Fakulti: _____, Jabatan: _____
Makmal: _____, Lokasi: Blok _____, Tinglat _____
No Tag Kebuk Wasap: _____, Penyelita Makmal: _____

ARAHAN (instruction) : Tick for items in working order / compliance.
(perkara yang diperiksa adalah dalam keadaan baik / mengikut arahan).
Cross for items that is spoilt / NOT functioning properly / non-compliance – REPORT to lab supervisor, log the report in "Action Taken" & follow-up.
(perkara yang diperiksa telah rosak / dalam keadaan tidak baik / tidak mengikut arahan) – LAPOR kepada Penyelita Makmal, rekodkan laporan ke dalam "Tindakan Yang Diambil & buat tindakan susutian).

No	Item (Perkara)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Air is not flowing out from the fume hood (tes airbuah). <i>Udara tidak keluar dari kebuk wasap (tes airbuah) – Tiada peredaran udara</i>												
2	The fume hood has an 'air flow indicator'. <i>Kebuk wasap mempunyai 'penunjuk aliran udara'.</i>												
3	No signs of physical damage (broken part, corrosion, etc) <i>Tiada tanda-tanda kerosakan fizikal (bahagian yang pecah, kakisan, dsb)</i>												
4	No traces of chemicals on work surface <i>Tiada kesan bahan kimia pada permukaan kerja</i>												
5	Sash is closed when fume hood not in use <i>Tetingkap ditutup apabila kebuk wasap tidak digunakan</i>												
6	The fume hood is not used for storing chemicals or evaporating chemical waste <i>Kebuk wasap tidak digunakan untuk menyimpan bahan kimia atau penguapan sisa kimia</i>												
7	No electric extension board is kept or used inside the fume hood <i>Tiada papan sambungan elektrik disimpan atau digunakan di dalam kebuk wasap</i>												
8	Sinks in fume hood is not clogged or leaking <i>Sungki di dalam kebuk wasap tidak tersumbat atau bocor</i>												
9	Sash stopper is in good condition <i>Penghenti tetingkap di dalam keadaan baik</i>												
10	No materials is blocking air flow inside/outside the fume hood <i>Tiada barang-barang yang menyekat aliran udara di dalam / di luar kebuk wasap</i>												
11	The fume hood is not emitting loud noise <i>Kebuk wasap tidak mengeluarkan bunyi bising</i>												
12	Lighting fixture is in working condition <i>Lighting pencabutan di dalam keadaan baik</i>												
13	DUPERIKSA (staff yang bertanggungjawab di makmal) OLEH: <i>INSPECTED (staff in-charge of the lab) BY</i>												
14	Tandatangan & NAMA Signatore Disemak oleh Penyelita Makmal (Pensyarah yang menyelia makmal PI / Pegawai Stans RO) <i>Checked by Lab Supervisor (Lecturer in-charge / PI/ Science Officer / RO)</i>												

APPENDIX 2

SCHEDULE II

[Sub regulation 27(3)]

Chemicals for which medical surveillance is appropriate

1. 4-Aminodiphenyl
2. Arsenic and any of its compound
3. Asbestos (all forms except crocidolite)
4. Auramine, Magenta
5. Benzidine
6. Beryllium
7. Cadmium and any of its compound
8. Carbon disulphide
9. Disulphur dichloride
10. Benzene including benzol
11. Carbon tetrachloride
12. Trichloroethylene
13. n – Hexane
14. bis (Chloromethyl) ether
15. Chromic acid
16. Chromium, metal and inorganic compounds, e.g. Water-soluble Cr VI compounds, Insoluble Cr VI compounds
17. Free crystalline silica
18. Isocyanates
19. Lead (including organic lead compounds)
20. Manganese
21. Mercury
22. Mineral oil including paraffin
23. b-Naphthylamine
24. 1-Naphthylamine and its salts
25. Orthotolidine and its salts
26. Dianisidine and its salts
27. Dichlorobenzidine and its salts
28. 4-Nitrodiphenyl
29. Nitro or amino derivatives of phenol and of benzene or its homologues
30. Nitrous fumes. Chromate or dichromate of potassium, sodium, ammonium or zinc
31. Pesticides
32. Pitch
33. Tar, bitumen or creosote
34. Vinyl chloride monomer (VCM)

APPENDIX 3


**PERSONAL PROTECTIVE EQUIPMENT (PPE)
ISSUANCE RECORD**

Employee's name:	
Facility/Laboratory:	
Job title:	

Note: this form should be retained in the staff member's personal file

The employee has a responsibility to:

- take reasonable care of the PPE provided;
- use PPE in accordance with the training and instruction given;
- to keep the PPE clean and return it to its place of storage after use; and
- report any loss or defect immediately to *insert job title*

TYPE OF PPE ISSUED	DATE ISSUED	EMPLOYEE'S SIGNATURE

APPENDIX 4

SECTION 1: Identification of the substance/mixture and of the company/undertaking

- 1.1. Product identifier
- 1.2. Relevant identified uses of the substance or mixture and uses advised against
- 1.3. Details of the supplier of the safety data sheet
- 1.4. Emergency telephone number

SECTION 2: Hazards identification

- 2.1. Classification of the substance or mixture
- 2.2. Label elements
- 2.3. Other hazards

SECTION 3: Composition/information on ingredients

- 3.1. Substances
- 3.2. Mixtures

SECTION 4: First aid measures

- 4.1. Description of first aid measures
- 4.2. Most important symptoms and effects, both acute and delayed
- 4.3. Indication of any immediate medical attention and special treatment needed

SECTION 5: Firefighting measures

- 5.1. Extinguishing media
- 5.2. Special hazards arising from the substance or mixture
- 5.3. Advice for firefighters

SECTION 6: Accidental release measure

- 6.1. Personal precautions, protective equipment and emergency procedures
- 6.2. Environmental precautions
- 6.3. Methods and material for containment and cleaning up
- 6.4. Reference to other sections

SECTION 7: Handling and storage

- 7.1. Precautions for safe handling
- 7.2. Conditions for safe storage, including any incompatibilities
- 7.3. Specific end use(s)

SECTION 8: Exposure controls/personal protection

- 8.1. Control parameters
- 8.2. Exposure controls

SECTION 9: Physical and chemical properties

- 9.1. Information on basic physical and chemical properties
- 9.2. Other information

SECTION 10: Stability and reactivity

- 10.1. Reactivity
- 10.2. Chemical stability
- 10.3. Possibility of hazardous reactions
- 10.4. Conditions to avoid
- 10.5. Incompatible materials
- 10.6. Hazardous decomposition products

SECTION 11: Toxicological information

- 11.1. Information on toxicological effects

SECTION 12: Ecological information

- 12.1. Toxicity
- 12.2. Persistence and degradability
- 12.3. Bioaccumulative potential
- 12.4. Mobility in soil
- 12.5. Results of PBT and vPvB assessment
- 12.6. Other adverse effects

SECTION 13: Disposal considerations

- 13.1. Waste treatment methods

SECTION 14: Transport information

- 14.1. UN number
- 14.2. UN proper shipping name
- 14.3. Transport hazard class(es)
- 14.4. Packing group
- 14.5. Environmental hazards
- 14.6. Special precautions for user
- 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

SECTION 15: Regulatory information

- 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
- 15.2. Chemical safety assessment

SECTION 16: Other information

- 16.1. Date of the latest revision of the SDS

APPENDIX 5

<p>NAME <input type="text" value="The name of the Laboratory / Workshop / Store"/></p> <p>ADDRESS <input type="text" value=""/></p> <p><i>(Department & PTI/Faculty address)</i> <input type="text" value=""/></p> <p>CITY: <input type="text" value="KUALA LUMPUR"/></p> <p>STATE: <input type="text" value="WILAYAH PERSEKUTUAN"/></p> <p>TELEPHONE NUMBER: <input type="text" value="03 -"/></p> <p>E-MAIL: <input type="text" value="Email Department/Kesua Jabatan/Kesua PTI"/></p>	<p>DOSH REGISTRATION: <input type="text" value=""/></p> <p>CODE OF: <input type="text" value="24"/></p> <p>CLASS OF: <input type="text" value="93100"/></p> <p>COMPANY ACTIVITIES (PLEASE ENTER (X) IN THE APPROPRIATE BOX):</p> <p><input type="checkbox"/> MANUFACTURER</p> <p><input type="checkbox"/> IMPORTER</p> <p><input type="checkbox"/> DISTRIBUTOR</p> <p><input type="checkbox"/> FORMULATOR</p> <p><input checked="" type="checkbox"/> END-USER</p>
---	--

SECTION C: NAME OF PERSON WHO PREPARED OR REVIEWED

PREPARED BY*1: _____ (signature)
 Name : _____
 Position & Grade: _____
 Date : _____

REVIEWED BY *2: _____ (signature)
 Name : _____
 Position & Grade: _____
 Date : _____

***1** The staff who prepare this document, i.e. *Pembantu Makmal/ Penolong Pegawai Sains/ Juruteknik/ Penolong Jurutera/ Juruteknologi Makmal Perubatan*, etc. If no STAFF PELAKSANA is assigned to the lab/workshop, the *Science Officer/ Research Officer/ Academic Staff* will have to prepare this document & REVIEWED by the HEAD of the PROGRAMME / SECTION.

***2** Document to be checked for accuracy & reviewed by *P&P Officer (Science Officer / Research Officer) or Academic Staff* who is in-charge of the lab/workshop/store or the Programme/Unit.

APPROVAL
 (Head of Department / Faculty/ PTJ)

APPROVED BY : _____ (signature)
 Name : _____
 Official Stamp : _____
 Date : _____

APPENDIX 6

CHEMICAL REGISTER GUIDELINES

The form is divided into three (3) section which is:

Section A - Company Information

This section gives the information about the company using or producing chemical hazardous to health

Section B – List of Chemical Hazardous to Health For Every Process Or Location (2 Different Format)

This section lists the chemical hazardous to health used or produced nor each process or location

Section C - Name of Person Who Prepared or Reviewed

This section gives details on the preparing or are viewing the chemical register.

ANNEX 1

Provides guide to complete the register. Employers may use this directly or may modify it, to include any additional information considered necessary for specific purposes or may enlarge the column width to fit their information.

ANNEX 2

Provides a list of code 1 of sector.

ANNEX 3

Provides a list of class 2 of industry.

ANNEX 4

Chemical Register forms

SECTION A: COMPANY INFORMATION:

Enter the name and complete address of the workplace where the chemical hazardous to health as identified in Section B are being used.

- Enter the Number of Factory Registration with the Department of Occupational Safety and Health (DOSH).
- Enter the Code of Industry with reference to the Schedule 1 of the Occupational Safety and Health Act (OSHA), 1994.
- Enter the Class of industry with reference to the industrial Classification of International Labor of Organisation (LO).
- Enter (/) the appropriate box (es) to indicate whether you are importer, manufacturer, distributor, formulator or end-user of the chemical hazardous to health.

SECTION B: LIST OF CHEMICALS HAZARDOUS TO HEALTH

1. LOCATION: indicate the name of location where the chemical (s) being used or produced.
2. PROCESS OPERATION: indicate the name of process operation where the chemical (s) being used or produced.
3. NO. OF HAZARDOUS CHEMICAL: Enter the total number of hazardous chemicals being used for each of location or process operation.
4. NO. OF WORKERS: Enter the number of male and female worker of each of the process or location.
5. Enter the detail identification of each hazardous chemical being used :
 - a. PRODUCT NAME:
Enter a registered trade name or product name of each hazardous chemical as stated in CSDS.
 - b. NAME OF CHEMICAL:
Enter the chemical name according to internationally recognised nomenclature and other common synonym/ acronym as stated in CSDS.
 - c. PHYSICAL FORM OF CHEMICAL: Enter the type of chemical either

A =	Aerosol	P =	Paste
F =	Fibre	PE =	Pellet
G =	Gas	PW =	Powder
L =	Liquid	SL =	Slurry
N =	Granule	S =	Solid
 - d. NO. OF WORKER EXPOSED:
Enter the number of workers exposed to each of chemical used or produced.

e. TYPE OF CONTROL MEASURES: Engineering Control

Indicate type of control measure (s);

- E = Enclosure
- I = Isolation
- LEV = Local exhaust ventilation
- GV = General ventilation
- W = Water spray

f. PPE

Indicate the type of personal protective equipment (PPE);

- C = Protective Clothing
- E = Eye Protection
- M = Dust Mask
- R = Chemical Cartridge Respirator
- O = others

g. USAGE OF CHEMICAL: TYPE:

Enter the type of usage of each chemical used or produced at each process or location whether as:

- B = By-product
- I = Intermediate product
- P = Product
- R = Raw Material
- S = Stored
- W = Waste

Or, other uses as;

- C = Cleaning
- D = Degreasing
- O = Other application

h. QUANTITY:

Estimate the yearly or monthly amount of chemical used or produced at each process or location. Quantity should be entered in 'kilogram ' or cubic meter' and should be expressed accurate to two (2) significant figures (for example, report 185 as 200 or 2,550 as 2,600)

- i. CAS NO.:
Refer to Abstract service Number as stated in the SDS.

- j. NAME OF ACTIVE INGREDIENTS:
If any, enter the name of active ingredients or dangerous components/constituents for each of hazardous chemical as stated in CSDS.

- k. COMPLY WITH CLASSIFICATION, PACKAGING AND LABELLING REGULATION, 1997: SDS
Indicate (Yes / No) for chemical used provided with Safety Data Sheet (SDS)

- l. CLASS
State the classification of the chemical under CPL Regulations, 1997.

Note:
If the chemical is classified using other classification system, please enter NA.

- m. LABEL
Indicate (Yes / No) for chemical used provided with Labelling.

- n. SUPPLIER
Enter the name, address, and contact number (tel. No./e-mail) of foreign or local supplier (s) whom DOSH may contact for clarification of information on the chemicals hazardous to health being supplied.

SECTION C. NAME OF PERSON WHO PREPARED OR REVIEWED PREPARED BY:
NAME, TITLE, SIGNATURE AND DATE:

Enter the name, title and signature of the person who prepared the form and the date prepared.

REVIEWED BY:
NAME, TITLE, SIGNATURE AND DATE:

Enter the name, title and signature of the person who reviewed the form and the date reviewed

Section A - Company Information

Section B - List of Chemical Hazardous to health for every process or location
Section C - Name of person who prepared or reviewed

CODE OF SECTOR

CODE	TYPE OF SECTOR
1	MANUFACTURING
2	MINING AND QUARRYING
3	CONSTRUCTION
4	AGRICULTURE
5	FORESTRY
6	FISHERY
7	LOGGING
8	ELECTRICITY UTILITY
9	GAS UTILITY
10	WATER UTILITY
11	SANITARY UTILITY
12	TRANSPORT
13	STORAGE
14	COMMUNICATION
15	WHOLESALE
16	RETAIL TRADES
17	HOTELS
18	RESTAURANTS
19	FINANCE
20	INSURANCE
21	REAL ESTATE
22	BUSINESS SURVICES
23	PUBLIC SURVICES
24	STATUTORY AUTHORITIES

APPENDIX 7

HAZARD PICTOGRAM

		
Flame	Oxidizer / Flame over circle	Explosion hazard
		
Gas Cylinder	Skull and crossbones	Corrosive
		
Exclamation Mark	Health Hazard	Environment

printable Hazard Pictograms

Reference: DOSH Hazard Pictogram

APPENDIX 8A

Appendix 8A: label/tag for in use chemical

 UNIVERSITI MALAYA <small>Fakulti Perubatan</small>	
Chemical name:	
Date prepared: <i>(ddmmyyyy)</i>	Prepared by: <i>(initial)</i>
Expiry date: <i>(ddmmyyyy)</i>	Remarks:
<i>insert hazard pictogram</i>	

example;

 UNIVERSITI MALAYA <small>Fakulti Perubatan</small>	
Chemical name:	0.1M Hydrochloric Acid
Date prepared: <i>(ddmmyyyy)</i> 01012022	Prepared by: <i>(initial)</i> ABC
Expiry date: <i>(ddmmyyyy)</i> 01042022	Remarks: Nil
	

APPENDIX 8B

Appendix 8B: label/tag for expired chemical

 UNIVERSITI MALAYA <small>Fakulti Perubatan</small>	
Date opening: <i>(ddmmyyyy)</i>	Expiry date: <i>(ddmmyyyy)</i>
Chemical Owner :	Consent form number:

example;

 UNIVERSITI MALAYA <small>Fakulti Perubatan</small>	
Date opening: <i>(ddmmyyyy)</i> 01012022	Expiry date: <i>(ddmmyyyy)</i> 01012027
Chemical Owner : Prof. ABC	Consent form number: XXXX

APPENDIX 9



CHEMICAL INVENTORY

No	Chemical Name	Brand	Product No; Lot No	Received Date (ddmmyy)	Expiry Date (ddmmyy)	Location	Pcga x Qty	Date Opened (ddmmyy)	Remark

APPENDIX 10

CHEMICAL STORAGE BY COMPATIBILITY CHART

Chemical Hazard (Refer Chemical Hazard Pictogram)	 Flammable	 Corrosive - Acid	 Corrosive - Base	 Oxidizer	 Toxic
 Flammable	Green	Red	Green	Red	Green
 Corrosive - Acid	Red	Green	Red	Green	Red
 Corrosive - Base	Green	Red	Green	Green	Green
 Oxidizer	Red	Green	Green	Green	Green
 Toxic	Green	Red	Green	Green	Green

Green = compatible ; Red = incompatible

APPENDIX 11

**CHEMICAL
HAZARDOUS TO
HEALTH**

**BAHAN KIMIA
BERBAHAYA PADA
KESIHATAN**

**coloured print on white paper*

APPENDIX 12

(page 1 of 2)



STATEMENT AND DECLARATION OF RESPONSIBILITY, OWNERSHIP OF LIABILITY OF EXPIRED CHEMICAL USAGE & STORAGE

I, (full name) hereby declare that I have read and understand Section 7.8, Faculty of Medicine Chemical Management Manual and agree to the following:

1. I understand that I am solely responsible for the safety of the expired chemical used/kept/stored in the department/unit/facility.
2. I understand the expiry extension is only for usage(s) that is known not to jeopardise the safety of laboratory personnel, equipment performance and data quality.
3. I understand and agree that monthly check on the chemical will be conducted to monitor the physical changes together with a controlled log book. Chemical exhibiting physical changes will be discarded immediately.
4. I understand the best practice of chemical handling and management is to dispose an expired chemical immediately.
5. I will comply with all the requirements of safe chemical handling and management as stated in the FOM Chemical Management Manual.

Name:

Designation:

Department:

Date:

(page 2 of 2)

Chemical Expiry Extension Request: Chemical Details

Person in-charge (Principal Investigator/Chemical Owner)	:		
Designation:	:		
Mobile Number:	:		
Name of Chemical	:		
CAS Number	:		
Hazards	:		
Received Date	:		
Expiry Date	:		
Estimated Volume/Weight	:		
Manufacturer	:		
Storage Location	:		
Purpose of retention	:		
Chemical Performance Analysis	:		
(Kindly attach a copy)			
Availability of SDS	:	YES	NO
(Kindly attach a copy)			
Availability of required PPE	:	YES	NO
(List down the required PPE)			
Availability of HIRARC	:	YES	NO
Availability of usage log	:	YES	NO
(Kindly attach a copy)			
Availability of monthly check log	:	YES	NO
(Kindly attach a copy)			
Reviewer: (FOM IKM Registered Chemist)		Approved by: (Dean, Faculty of Medicine)	
Decision: ACCEPT/REJECT		Signature & Stamp:	
Comment:		Date:	
Signature & Stamp:			
Date:			

APPENDIX 13**EMERGENCY RESPONSE PROCEDURE**

1. Responsibility and Accountability
 - a. It is the responsibility of the Head of the Department/Unit, Principal Investigator. PI is to ensure the following:
 - b. Review of Safety Data Sheets (SDS) for all chemicals used in the laboratory.
 - c. Prepare a chemical spill kit based on the potential chemical spills and the hazards associated with chemicals used in his/her laboratory.
 - d. Ensure all laboratory users receive appropriate chemical safety training and familiarize themselves with the spill response plan.
 - e. It is the responsibility of all laboratory users to acquire sufficient knowledge in chemical safety, use PPE that are available in the chemical spill kit and follow this SOP in case of emergency

2. Chemical Splash into the Eye(s)

Toxic chemical splash into the eye(s) can cause serious injury that may lead to blindness.

Treatment

 - 2.1. Forcibly keep eye lids open.
 - 2.2. Wash eyes gently using clean cold water or normal saline from an Eyewash Station/water source.
 - 2.3. Keep washing steadily for at least 20 minutes.
 - 2.4. Rinse/wash hands/body thoroughly using a Shower to remove chemical.
 - 2.5. Remove contact lens if you are wearing one.
 - 2.6. Do not rub eyes.
 - 2.7. Do not use eye drops until seen by a doctor.
 - 2.8. Seek medical help immediately.
 - 2.9. Remember the name of the chemical and take its SDS along with the personnel to the treating doctor.
 - 2.10. Notify the incident through the helpdesk system and complete the incident report form (Appendix 15 for incident report).

3. Chemical splash on skin
 - 3.1. Remain calm.
 - 3.2. Quickly remove all contaminated clothing.
 - 3.3. Immediately wash away contaminant using the safety shower or other available source of water.
 - 3.4. Allow water to run over the affected body area for at least 15 minutes.
 - 3.5. Do not use neutralizing chemicals, creams, or lotions.
 - 3.6. Do not move an injured person unless they are in further danger.
 - 3.7. Seek medical help immediately.

- 3.8. Remember the name of the chemical and take its SDS along with the personnel to the treating doctor.
- 3.9. Notify the incident through the helpdesk system and complete the incident report form (*Refer APPENDIX 15 for Incident Report Form*).

4. Chemical Spill

4.1. Minor Chemical Spill

- 4.1.1. Remain calm.
- 4.1.2. Quickly remove all contaminated clothing.
- 4.1.3. Immediately wash away contaminant using the safety shower or other available source of water.
- 4.1.4. Allow water to run over the affected body area for at least 15 minutes.
- 4.1.5. Do not use neutralizing chemicals, creams, or lotions.
- 4.1.6. Do not move an injured person unless they are in further danger.
- 4.1.7. Seek medical help immediately.
- 4.1.8. Remember the name of the chemical and take its SDS along with the personnel to the treating doctor.
- 4.1.9. Notify the incident through the helpdesk system and complete the incident report form (*Refer APPENDIX 15 for Incident Report Form*).

4.2. Major Chemical Spill

- 4.2.1. Remain calm.
- 4.2.2. Quickly remove all contaminated clothing.
- 4.2.3. Immediately wash away contaminant using the safety shower or other available source of water.
- 4.2.4. Allow water to run over the affected body area for at least 15 minutes.
- 4.2.5. Do not use neutralizing chemicals, creams, or lotions.
- 4.2.6. Do not move an injured person unless they are in further danger.
- 4.2.7. Seek medical help immediately.
- 4.2.8. Remember the name of the chemical and take its SDS along with the personnel to the treating doctor.
- 4.2.9. Notify the incident through the helpdesk system and complete the incident report form (*Refer APPENDIX 15 for Incident Report Form*).

4.3. Spill Control/ Containment and Clean-up Materials/ Supplies

- Every laboratory that uses chemicals must have access to a spill control kit appropriate to the chemicals used with at least enough containment and cleanup materials to handle an approximately 1 L to 2 L spill of liquid or 1 kg of dry chemical (or the largest container in the laboratory).
- As items depleted, it is the responsibility of each PI to replace the items.
- The kit needs to be checked periodically by the officer in charge to ensure that proper spill kit materials are maintained.

- Spill kits must be located strategically and easily accessible in an emergency.

4.3.1. Chemical Spill Kit Contents:

- a. Absorbents
 - Universal Spill Absorbent - 1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate, and sand. This all-purpose absorbent is good for most chemical spills including solvents, acids (not good for hydrofluoric acid), and bases.
- b. Neutralizers (in spray bottle)
 - Acid Spill Neutralizer - sodium bicarbonate, sodium carbonate, or calcium carbonate.
 - Alkali (Base) Neutralizer - sodium bisulfate.
 - Solvents/Organic Liquid Absorbent - Inert absorbents such as vermiculite, clay, sand, Flo Dri, and Oil Dri.
 - Bromine Neutralizer - 5% solution of sodium thiosulfate and inert absorbent.
 - Hydrofluoric Acid - HF compatible spill pillow or neutralize with lime and transfer to a polyethylene container
- c. Personal Protective Equipment (PPE)
 - Goggles and Face Shield
 - Heavy Neoprene Gloves
 - Disposable Lab Coat and Corrosive Apron
 - Plastic Vinyl Booties
 - Dust Mask/Respirator (All lab personnel must be properly fit tested before using a respirator.)
- d. Clean-Up Material
 - Plastic Dust Pan and Scoop
 - Laboratory tongs- to pick up broken glasses
 - Plastic Bags (30 Gallon, 3 mil thickness) for contaminated PPE
 - One Plastic Bucket (5-gallon polyethylene) with lid for spill and absorbent residues
- e. Others
 - Hydrofluoric Acid Antidote Gel - Calcium Gluconate gel (always check expiration date)
 - Mercury Spill Kit - Aspirator Bulb and Mercury Decontaminating Powder
 - Alkali Metals - Dry sand or a Class "D" Fire Extinguisher
 - Acid Chlorides - Oil Dri, Zorb-All, or dry sand

APPENDIX 14

ACT

1. Strategic Trade Act 2010 (Act 708,2010)
2. Malaysian Quarantine and Inspection Services (MAQIS), Act 2011
3. Prevention and Control of Infectious Diseases Act (Act No. 342, 1988), Regulations 2006
4. Occupational Health and Safety Act (Act No. 514, 1994)
5. Postal Services Act 2012 (Act No.741,2012)
6. Factories and Machinery Act (Amendment) 2006
7. Factories and Machinery Act 1967 (Revised - 1974) (Acts 139)

REGULATION

International Regulation

1. United Nation Security Council Resolution 1540
2. UN Recommendations on the Transport of Dangerous Goods
3. IATA Dangerous Goods Regulations
4. Chemical Weapons Convention (CWC)

Malaysia

1. OSH (Employers Safety and Health General Policy Statements) (Exception) Regulations 1995
2. OSH (Safety and Health Committee) Regulations 1996-SHC
3. OSH (Use and Standards of Exposure of Chemicals Hazardous to Health) Regulations 2000-USECHH
4. Occupational Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations 2004 (P.U.(A) 128/2004
5. Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

Regulations Under Factories and Machinery Act 1967 (Act 139)

1. Factories and Machinery (Mineral Dust) Regulations 1989.
2. Factories and Machinery (Asbestos) Regulations 1986.
3. Factories and Machinery (Leads) Regulation 1984

Code of Practice

1. Hazard Pictogram
2. Industry Code of Practice on Chemicals Classification & Hazard Communication 2014
3. Industry Code of Practice on Chemicals Classification and Hazard Communication (Amendment) 2019: Part 1 Popular
4. Industry Code of Practice on Indoor Air Quality, 2010

GUIDELINES

1. Panduan Menjalankan Penaksiran Risiko Kepada Kesihatan Secara Generik 2019
2. A Manual of Recommended Practice on Assessment of the Health Risks Arising from the Use of Chemicals Hazardous to Health at the Workplace (3rd Edition) (First Reprint 2018)
3. Guidelines on Storage of Hazardous Chemicals: A Guide for Safe Warehousing of Packaged Hazardous Chemicals, 2005
4. Guidelines on the Control of Chemicals Hazardous to Health, 2001
5. Guidelines for the Preparation of a Chemical Register, 2000
6. Assessment of the Health Risks Arising from the Use of Hazardous Chemical in the Workplace (2nd Edition), 2000
7. Panduan Ringkas Pengendalian Tumpahan Merkuri DOSH
8. Guidelines on Monitoring of Airborne Contaminant for Chemical Hazardous to Health
9. Guidelines on the Use of Personal Protective Equipment Against Chemicals Hazards, 2005
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11. Guidelines on the Control of Chemicals Hazardous to Health, 2001
12. Guidelines for the Preparation of a Chemical Register, 2000
13. Guidelines on Method of Sampling and Analysis for Airborne Lead, 1997

APPENDIX 15

LAMPIRAN D

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LAPORAN KEMALANGAN/INSIDEN

SEKSYEN I - BUTIR-BUTIR PELAPOR

Nama : _____
Jawatan (sekiranya berkerja di UM): _____
Tempat Kerja : _____
No. K.P. : _____
No. Tel. : _____ (Pejabat) _____ (H/p)
Alamat Dihubungi: _____

SEKSYEN II - BUTIR-BUTIR KEMALANGAN/INSIDEN

Tempat Kemalangan/Insiden: _____
Tarikh Kemalangan/Insiden : _____
Masa Kemalangan/Insiden : _____

Keterangan Lanjut Tentang Kemalangan/Insiden:
(Gunakan kertas tambahan jika perlu)

Tandatangan

Tarikh Laporan: _____

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ISBN 978-967-26545-0-6



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Printed by
University of Malaya Press
50603 Kuala Lumpur