



Chemicals?



"Chemical" means chemical elements, or compounds or mixtures thereof, whether natural or synthetic, but does not include micro-organism.

Chemical Hazardous to Health

Any chemical or preparation which :

- (a) Is listed in Schedule I and II USECHH Regulation 2000.
- (b) possesses any of the properties categorised in Part B of Schedule I of the CLASS Regulation 2013.
- (c) comes within the definition of " pesticide " under the Pesticides Act 1974; or
- (d) is listed in the First Schedule of the Environmental Quality (Schedule Wastes) Regulations 1989.

Reference : Occupational Safety & Health (Use & Standards of Exposure of Chemicals Hazardous to Health) Regulation 2000.

Proper Chemical Safety Tips

CREATE A RESPONSE PLAN

Think about what could go wrong and pay close attention to what you're doing while you work. Learn about emergency procedures and equipment

USE PROTECTIVE GEAR

Use the necessary PPE. Inspect it carefully before each use to make sure it's safe to use. Replace worn out or damage PPE.

REGULAR INSPECTION

Make sure all containers and equipment used to handle chemicals are in good working condition. Check glassware for signs of cracking and make sure any contaminated items are disposed properly

ALWAYS READ LABELS & SDS

Read labels and the safety data sheet (SDS) before using any material to make sure you understand hazards and precautions related to the chemical used. Communicate hazards to everyone in the facility

SAFETY EQUIPMENT

Ensure that you know the location of eyewash stations, drench showers, fire extinguishers, and first aid kits, and regularly check that they are properly maintained. so that users who are exposed to chemicals can quickly access these tools in an emergency to lessen the effects of their exposure.

KEEP AIR FLOWING

Ensure good ventilation in laboratories and other areas where chemicals are used. Make sure proper airflow and filtration systems are in place to minimize chemical exposure.

GET ORGANIZED

Store all materials properly. Separates chemicals based on the incompatibility group. Make sure the store is well ventilated and free from water or any ignition sources. Practice regular house keeping and self hygiene to reduce the contamination risk

FOCUS ON TRAINING

Engage in continuous education to stay informed and prepared. Ensure that every member who is at risk of chemical exposure fully understands the associated risks and hazards, as well as how they could be personally impacted



Procurement of Chemical



RISK CONTROL

Purchasing based on resource needs for teaching, research, consulting, and service activities or general activities.

Elimination and Substitution:

- Safer alternatives:
 - Investigate other chemicals, method & procedure that is safer. Consider waste disposal production
- Substitution: Choose the less hazardous chemicals for example hexane instead of heptane. N-heptane will not form toxic metabolites
- Reduce the size: Always purchase minimal volumes for the rate of use that is required
- Reduced the concentration: Always purchase the lowest concentration of chemicals as far as practicable for the activity.

Engineering and isolation:

- Storage capacity available at the storage location
- Consider incompatibility, space and stability of chemical

Consult Laboratory Manager or PIC Chemical Store of each research laboratories for :

- List of chemicals available
- Current stock level
- Quantities of chemicals and their use at the facility

ORDERING CHEMICAL

Use USM e-procurement method to place orders.

- Ensure the Safety Data Sheet (SDS) and/or certificate of analysis (CoA) specified in the e-procurement specification, are provided in both Malay and English versions

REGULATION REQUIREMENT

Labeling & Relabeling

- Labeling on each packaging must comply to CLASS Regulation 2013

Safety Data Sheet (SDS)

- Supplier must be able to supply chemical together with the SDS that comply to ICOP 2014.

First Aid, Emergency Response & PPE

- Refer SDS.

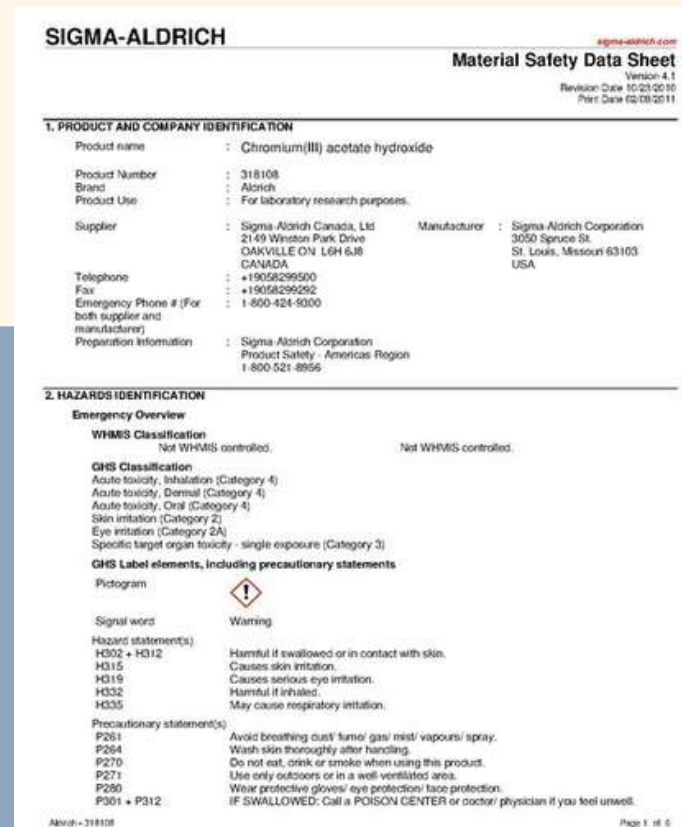
Training & Safe Work Procedure

- Training is conducted.
- Safe work procedure is prepared.



Safety Data Sheets (SDS)

Compulsory in Malay & English Version



DEFINITION

SDS is an **up-to date hand-out** or **information sheet** containing relevant **information pertaining to the hazardous chemicals** which is vital for **establishing arrangements in the safe use of the chemicals at work.**

LEGAL REQUIREMENT



CLASS REGULATION 2013 Part V – Safety Data Sheet Duty to furnish Safety Data Sheet (Regulation No. 13)

1. A supplier shall furnish a Safety Data Sheet to a chemical recipient for:
 - Each hazardous chemical supplied; and
 - Any chemical mixture if hazardous substance concentration exceeding the cut-off value [even though the mixture itself may not be classified as hazardous substance].

OBJECTIVES OF SDS

1

To make users of hazardous chemicals **understand safety recommendations and the rationale.**

3

To encourage the users to provide inputs in **establishing strategies and recommendations for the safe use of the hazardous chemicals.**

2

To **create awareness** of the consequences of failure to comply.

4

To ensure that users of hazardous chemicals **recognize the symptoms of overexposure.**

WHEN TO REVISE SDS



A supplier shall revise a SDS if:

1. **New information** on a particular hazardous chemical becomes available
2. **More than five years have elapsed** since the last date of preparation or revision of the Safety Data Sheet or
3. So **directed by an officer.**

SDS FORMAT

Section 1: Identification of the hazardous chemical and of the supplier;
 Section 2: Hazard identification;
 Section 3: Composition and information of the ingredients of the hazardous chemical;
 Section 4: First-aid measures;
 Section 5: Fire-fighting measures;
 Section 6: Accidental release measures;
 Section 7: Handling and storage;

Section 8: Exposure controls and personal protection;
 Section 9: Physical and chemical properties;
 Section 10: Stability and reactivity;
 Section 11: Toxicological information;
 Section 12: Ecological information;
 Section 13: Disposal information;
 Section 14: Transportation information;
 Section 15: Regulatory information; and
 Section 16: Other information.



Receiving of Chemical



Upon arrival of chemical, we must inspect each item ordered.

CHECKLIST ON RECEIPT OF CHEMICAL

- The special requirements of the chemicals are met. e.g: refrigeration and receipt only to an authorized person
- Delivered chemicals match the description as per the order.
- Packaging is free from contamination.
- Delivered chemicals has clear labelling comply with CLASS 2013 Regulations such as:
 1. The product identifier
 2. The supplier identification
 3. Name of active ingredient
 4. Physical form of chemical
 5. The hazard statement
 6. The hazard pictogram
 7. The precautionary statement
- Invoice and delivery order (DO) is provided for finance purposes.

CHECKLIST WHEN CHEMICAL ARRIVED TO THE LABORATORY

- Ensure the current SDS and/or Certificate of Analysis (CoA) is provided / accessible
- Store SDS in a dedicated folder on a secure shared drive (soft copy) and accesible for all users
- Contact the user for the process of claiming the chemical materials
- Update the Chemical Inventory and Chemical Register.
- Write date of receipt, owner name on chemical container.
- Chemical with **NO expiration date**: Store until 5 years from opening date (within 1 year from DO date) and record expiry date in chemical registration
- Store the chemicals correctly and safely.

CHEMICAL INVENTORY BY USER

AT THE ENTRANCE OF CHEMICAL STORE



Scan this QR code **BEFORE STORING** chemical

"If you DO NOT properly record stored items, they may be at risk of being disposed of or lost"



Scan this QR code **BEFORE TAKING OUT** chemical

Applies **ONLY to stock** taken out and NOT RETURNED

CHEMICAL REGISTRATION BY LABORATORY STAF

- Section A: Register of Chemicals Hazardous to Health (Company information)
- Section B: List of Chemicals Hazardous to Health (Chemical information)
- Section C: Name of Person Who Prepared or Reviewed

CHEMICAL STORAGE

Display warning signs/stickers noting that the area is a storage area for hazardous chemicals at the entrance of chemical store to notify all authorize personnel (coloured print on white paper)



AMARAN / WARNING !

KAWASAN PENYIMPANAN BAHAN KIMIA BERBAHAYA KEPADA KESIHATAN

CHEMICALS HAZARDOUS TO HEALTH STORAGE AREA

Separate and segregate chemical based on chemical properties or hazard classification and compatibility with other chemical

Do's

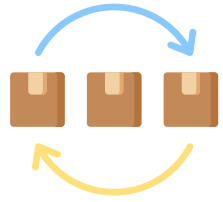
- Use Appropriate Storage as specified in the Safety Data Sheets (SDS).
- Fix shelves to the wall and install rim guards on the edges to prevent falls.
- Place heavier or larger bottles on lower shelves.
- Ensure chemical containers and lids are in good, secure condition.
- Label storage cabinets, lockers, and refrigerators with the type of chemicals they contain.
- Wear appropriate personal protective equipment (PPE) when handling hazardous chemicals, ensuring that PPE is undamaged

Don'ts

- Do not store food or beverages in refrigerators used for chemical storage. Label these areas with: "No Food - Chemical Storage Only."
- Do not store chemicals on shelves higher than 1.5 meters or above shoulder level.
- Do not store liquid chemicals above eye level, in aisle ways, on laboratory counters, or in locations where they can be easily knocked over.
- Do not expose chemicals to heat or direct sunlight.
- Eating, drinking, and smoking are strictly prohibited in chemical storage areas.

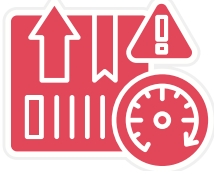


Handling of Chemical



First-in, First-out (FIFO)

Prioritize the use of older chemicals first.



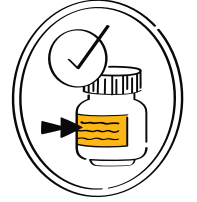
First Expired, First Out (FEFO)

Prioritize chemicals with the nearest expiration dates for use before newer ones.



Chemical Identification

Identify all chemicals involved in the work process before beginning any tasks.



Read Labels

Always read chemical labels before use.



Safety Data Sheet (SDS)

Understand the relevant SDS before handling any chemicals. Regularly review and update the SDS for new information



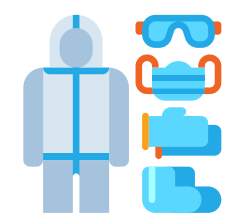
Standard Operating Procedures (SOPs).

Strictly observe and comply SOPs



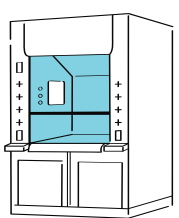
Understand Hazards

Familiar with the potential hazards and know the appropriate actions to take such as spills



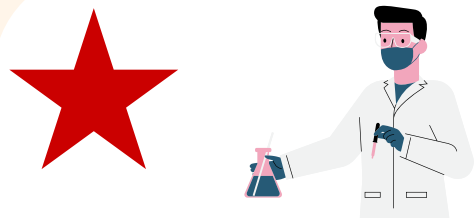
Personal Protective Equipment (PPE)

Wear suitable PPE, confirming that it is undamaged



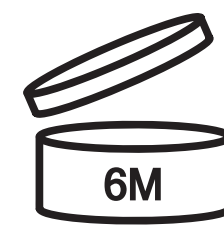
Ventilation

Ensure the fume hood is operational and use it to control exposure during experiments.



Limit Quantities

Only keep small working quantities of chemicals in laboratories; excess chemicals should be stored in a designated chemical storage area.



Track Usage

Keep track of when each chemical was first opened. Write open date



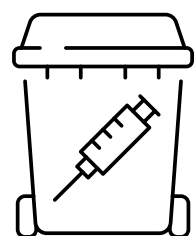
Avoid Mixing Unknowns

Never mix unknown compounds.



Avoid Contamination

Never return excess reagents or chemicals to their original stock bottles.



Disposal Preparedness

Have disposal containers ready before starting work.



Work Surface Cleanliness

Maintain a clean work surface both before and after completing tasks.



Proper Storage

Store chemicals in their original and designated locations



The owner of the chemical will hold responsibility for any incidents caused by improper chemical usage, handling and storage



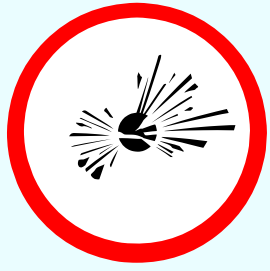
Labelling & Relabelling of Chemical

CLASS REGULATIONS 2013

CHEMICAL PICTOGRAM



FLAMMABLE



EXPLOSIVE



TOXIC



CORROSIVE



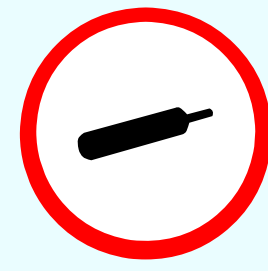
OXIDIZING



HEALTH HAZARD



HARMFUL IRRITANT



GAS CYLINDER



DANGEROUS TO AQUATIC ENVIRONMENT

LABELLING

Please make sure all the chemical purchased for teaching & research purposes adhere to CLASS Regulations 2013, which require a supplier to label every packaging of hazardous chemical legibly and indelibly containing the following information :



Container size >125mL

FORMALDEHYDE SOLUTION
 Ingredient & Concentration: Formaldehyde (CAS. No.: 50-00-0) : 37%
 Water : 63%

DANGER BAHAYA

HAZARD STATEMENT
 Causes skin irritation.
 Toxic if swallowed, in contact with or if inhaled.
 Causes severe skin burns and eye damage.
 May cause an allergic skin reactions.

PERNYATAAN HAZARD
 Menyebabkan kerengsaan kulit.
 Maut jika tertelan, terkena kulit atau jika tersedut.
 Menyebabkan lencuran kulit dan kerosakan mata yang teruk.
 Boleh menyebabkan tindak balas alahan kulit.

PRECAUTIONARY STATEMENT
 Keep away from heat/sparks/open flames/hot surface.
 No smoking.
 Avoid breathing vapour.
 Use only outdoors or in a well ventilated area.
 Wash hands thoroughly after handling.
 Obtain special instruction before use.
 Do not handle until all safety precautions have been read and understood.

PERNYATAAN BERJAGA-JAGA
 Jauhkan dari haba/percikan api/nyalaan terbuka/permukaan panas.
 Dilarang merokok.
 Elakkan daripada menyedut wap.
 Gunakan hanya di luar bangunan atau di dalam kawasan pengudaraan yang baik.
 Basuh tangan dengan baik selepas mengendalikan.
 Dapatkan arahan khas sebelum menggunakan bahan.
 Jangan kendalikan bahansehingga semua langkah berjaga-jaga keselamatantelah dibaca dan difahami.

Manufacturer: XYZ Co. Limited, 515 Touhy Avenue, Des Plaines, IL 60018 USA (24hr Emergency Tel No. 800 424-9300) (Pengilang)
 Supplier: ABCD Kimia Sdn. Bhd., 1126, Jalan Kg. Arap, 50534 Kuala Lumpur (Tel: 03-273 1234, Fax: 03-0000-1234, Emergency: 1-800-1234567. (Pembekal)

Prepared by: _____ Date prepared: _____
 Date Expired: _____

Container size <125mL

FORMALDEHYDE SOLUTION
 Ingredient & Concentration: Formaldehyde (CAS. No.:50-00-0) : 37%
 Water : 63%

DANGER BAHAYA

Read Safety Data Sheet before use
Baca helaian data Keselamatan sebelum digunakan

Manufacturer: XYZ Co. Limited, 515 Touhy Avenue, Des Plaines, IL 60018 USA (24hr Emergency Tel No. 800 424-9300) (Pengilang)
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Prepared by: _____ Date prepared: _____
 Date Expired: _____

3 Supplier Identification

2 Hazard Pictogram

1 Product Identifier

4 Precautionary Statement

5 Hazard Statement

6 Signal Word

3 Supplier Identification

2 Hazard Pictogram

1 Product Identifier

4 Statement: Read SDS before use

5 Signal Word

RE-LABELLING

When a chemical hazardous to health is transferred to another container, other than that in which it was originally supplied, the container shall be re-label.

Chemical hazardous to health is **USE IMMEDIATELY: Chemical DO NOT NEED to RE-LABEL**

Re-label as according to CLASS Regulation 2013 format

Chemicals that is **not being used within a normal work shift.**

1

Chemical that is **hazardous to health**

2

Chemicals used in a **chemical testing laboratory**

3

CHEMICAL LABELLING INFORMATION FOR NON HAZARDOUS

DISTILLED WATER

Prepared by: _____ Date prepared: _____
 Date Expired: _____

Re-label with the chemical name or the trade name as written on the original label

1. Chemicals that is used within a **normal work shift**
2. Chemical that is **NOT hazardous to health**



Safe Transporting of Chemical



1

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wear the proper PPE

2

READ SAFETY DATA SHEET (SDS) AND DO PLAN

Read SDS before handling. Determine the proper shipping / transportation & understand the hazard presented. Plan routes and destinations to minimize travel time and distance

3

BE RESPONSIBLE

Never leave chemicals unattended or stored in a vehicle. Avoid leaving or storing hazardous chemicals in corridors, departmental offices, or any other non-laboratory locations.

4

INCOMPATIBILITY

Do not place incompatible chemicals together in the same container during movement.

5

SECOND CONTAINER

Use sturdy carts as secondary containers when transporting heavy containers or over long distances to prevent spillage

6

MECHANICAL AID

Use bottle carriers or trolleys as secondary containers to contain spills in case of breakage.

7

AMOUNT

Transport only the minimum amount of material in the lowest concentration necessary for the demonstration or educational activities.

8

UPDATE CHEMICAL INVENTORY

Immediately update chemical inventories to reflect the relocation of chemicals.



Waste Disposal of Chemical



1

CHEMICAL ELIGIBLE FOR DISPOSAL

- Chemicals with an **Expiration Date** on the Original Bottle: Discard immediately after the expiry date.
- Chemicals with **No Expiration Date**: Store more than 5 years or chemical showed any physical changes
- If they meet any of the following criteria:
 - **Unlabeled or Improperly Labeled**
 - **In Poor Condition**
 - **Expired**
 - **No Longer Required**

2

WASTE STORAGE CONTAINER

- **Use Compatible Containers:** Compatible with the chemical waste, durable, and capable of preventing spillage or leakage.
- **Sort Chemical Waste :** Sort chemical waste into appropriate waste bottles or containers.
- **Avoid Incompatibility:** Never pour chemical waste that is incompatible with previously stored chemicals into an active container, even if the bottle has been washed.
- **Separate Aqueous and Organic Waste:** Keep harmful aqueous waste separate from organic solvent waste.
 - Only non-hazardous inorganic aqueous waste without biological constituents permitted to be poured down the sink.
- **Collect Solid Waste Safely:** Collect chemically contaminated solid waste and broken glass in a sharps bin.
- **Keep Containers Closed:** Keep the waste container closed at all times, opening only for adding or removing waste.
- **Avoid Common Areas:** Never place chemical waste in common areas such as corridors or near floor drainage points.
- **Do Not Overfill Containers:** Do not fill containers to full capacity. Transfer waste to a temporary storage area when the container is approximately 85% full.

3

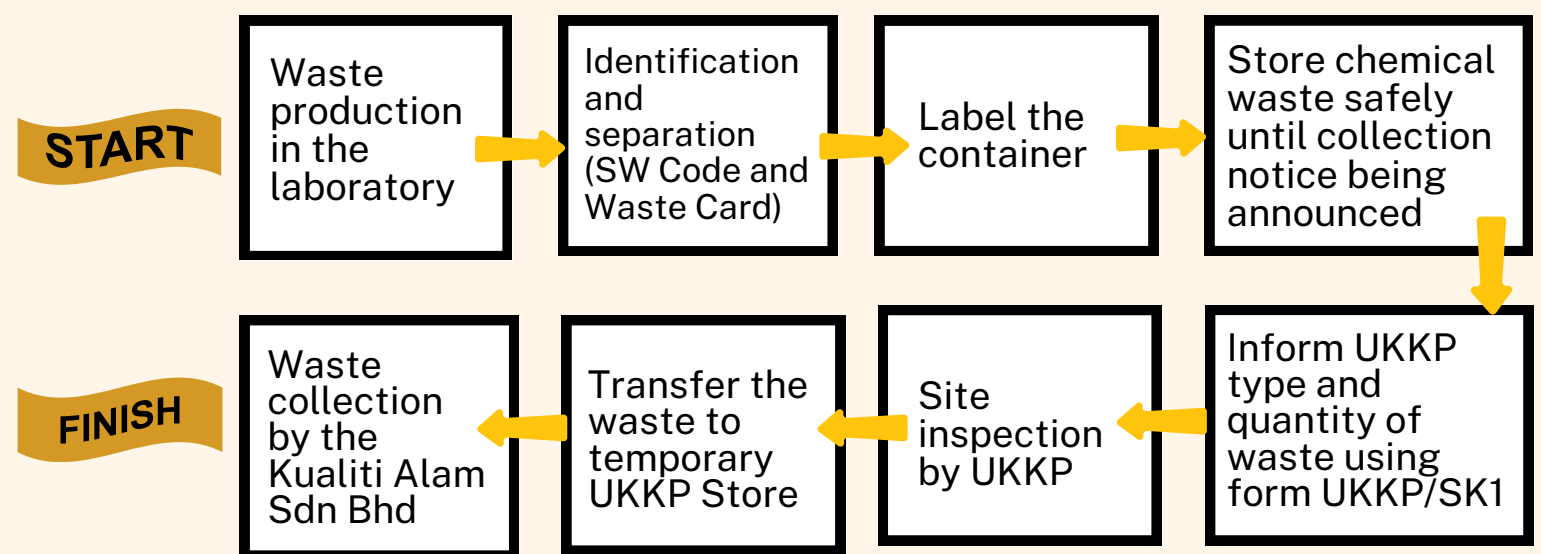
TEMPORARY STORAGE WASTE AREA

- **Store waste at a designated place safely and properly**
- Label the waste area
- Inspect waste periodically from time to time for any spills or leak



4

SCHEDULED WASTE COLLECTION



SW: Schedule Waste
UKKP: Unit Keselamatan dan Kesihatan Pekerjaan USM

5

DISPOSAL OF USED OR UNUSED CHEMICAL STOCK.

If there are no requests and the unused chemicals exceed 50% of their original container/content, they are eligible for disposal.

Labelling and Marking

Announce and offer surplus chemicals to departments or other parties in need (by email / WhatsApp).

No takers, fill up KEW.PS-19 UKKP

Sent the completed form together with an official memo/email indicating/proving that the stock of these chemicals has been distributed/offered to Sekreteriat Jawatankuasa Pelupusan Aset dan Barang Universiti, Jabatan Bendahari for approval

Store chemical until collection notice being announced

Site inspection by Jawatankuasa Pelupusan Aset dan Barang Universiti, Jabatan Bendahari

Sent approval to UKKP. Collection done by Syarikat Kualiti Alam