Chemical Hazards & Storage Guidance

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Revision Record

Issue	Date	Reason for Review
Rev 1	June 2023	Due for review & transferred onto new document template

Contents

1.0 Purpose of the Guidance

The purpose of this guidance is to outline best practice with regard to chemical hazard management. Everyone who works with chemicals of any sort must ensure, before work commences, that they:

- understand the hazards associated with the chemical
- know what precautions need to be taken
- understand how to safely store chemicals

2.0 Scope of Guidance

This guidance applies to all activities carried out by the University of Aberdeen which involve the use of substances hazardous to health, and all premises owned, rented or temporarily used by the University.

3.0 Definitions / Acronyms

Term	Definition
COSHH	Control of Substances Hazardous to Health
SDS	Safety Data Sheet
PPE	Personal Protective Equipment
Hazardous substance	A hazardous substance is any substance that has one or more inherent hazardous property. This includes flammability, explosiveness, toxicity, and the ability to oxidise.

4.0 Procedure

4.1 Chemical Hazards

The main hazards of chemicals are:

- The toxic effects of chemicals if they enter the body, both short and long term
- The corrosive effects of some chemicals if they come into contact with human tissue or other materials
- The flammable nature of some chemicals
- The reactive nature of some chemicals – often when incompatible chemicals come together

The hazards need to be considered during:

- The storage of chemicals
- The use of chemicals
- The disposal of chemical waste

Consideration must also be given to what will be done in the event of a spillage (or other uncontrolled release) of a chemical.

4.2 Safety Data Sheets

Supervisors should get their students into the habit of consulting hazard data sheets as part of the process of carrying out a chemical risk assessment.

4.3 Chemical Risk Assessment

Also known as a COSHH assessment, these assessments must always take account of the risks created by any chemicals which are used.

The assessment must always address:

- Storage of chemicals
- Use of chemicals
- Disposal of waste
- Actions to take in the event of a spillage

The wide range of chemicals which are used in the University means that it is not possible here to provide anything other than very general guidance on precautions which should be taken. Supervisors of those using chemicals are responsible for ensuring that hazards are identified and that necessary precautions are taken. The principle that it is those controlling the work who should determine how it is carried out safely is well established in law.

4.4 Storage of Chemicals

Symbol	Hazard Type	Properties	Storage
All chemicals		- Various	- Storage containers (including glassware a chemical may have been decanted into) must be clearly and correctly labelled - Correct names are required e.g. labelling a bottle only as “solution A” would not be acceptable - Stored in a dedicated chemical store in accordance with the specific properties of the chemical - Liquids in bottles must be placed in specific bottle carriers when being transported to / from storage areas outside the laboratory - Bunds must contain 110% of the volume of the largest container and be constructed of a material which will not degrade in the event of a spill.

	Flammable	-	- Metal flammables cabinet that is completely enclosed that is designed to comply with HSG 51 - NO cardboard or other combustible material beside cabinet - Do not store with oxidisers or inorganic acids - Only to be stored in cold rooms or refrigerators if they are internally 'spark-free'
	Toxics, poisons, mutagens, carcinogens	- Exposure can cause chronic health hazards - Avoid inhalation & skin contact - Many toxic solvents are highly volatile	- Store in poisons cabinet with controlled access
	Oxidisers	- Highly reactive, particularly perchloric acid - Many react with each other - Produces oxygen which feeds fire and makes it very difficult to extinguish - Reacts with many things, potentially causing explosions or corrosion of surfaces	- Oxidisers should be separated from each other by using plastic containers - Store in designated metal oxidisers cabinet that is designed to comply with HSG 51 - Do not store directly on wooden shelf or paper - Can be stored with mineral acids but not organic acids - Do not store with flammables
	Corrosives	- Acids and alkalis are both corrosive substances - They should be stored separately as accidental mixing of concentrated materials can produce heat and fumes - Note that corrosive fumes may damage metal fittings	- Avoid storing acids & alkalis together - Vented or metal cabinet - Containment tray to prevent any spillages – tray to be 110% volume of the largest container stored in it
Chemicals with no great storage option e.g. Hydrofluoric acid, explosives etc.		- Reacts with many materials	- Keep isolated from other chemicals - Follow specific COSHH assessment guidance
	'Low hazard' chemicals	- E.g. cleaning chemicals	- Even 'low hazard' chemicals should be stored in a designated cupboard

4.5 Carcinogens

The procedures in this section are mandatory for work with Category 1, Category 2 and Category 3 carcinogens.

Category 1

These are substances known to be carcinogenic to people. There is sufficient evidence to establish a casual association between human exposure to a substance and the development of cancer. If purchased from a supplier they are marked:

- R45 MAY CAUSE CANCER or
- R49 MAY CAUSE CANCER BY INHALATION

Category 2

These are substances which should be regarded as if they are carcinogenic to people. There is sufficient evidence to provide a strong presumption that human exposure to a substance may result in the development of cancer, generally on the basis of appropriate long-term animal studies and other relevant information. If purchased from a supplier they will be marked:

- R45 MAY CAUSE CANCER or
- R49 MAY CAUSE CANCER BY INHALATION

Category 3

These are substances which cause concern for people owing to possible carcinogenic effects, but in respect of which the available information is not adequate for making a satisfactory assessment. There is some evidence from appropriate animal studies, but this is insufficient to place the substance in Category 2. If purchased from a supplier they will be marked:

- R40 POSSIBLE RISK OF IRREVERSITBLE EFFECTS

Rules When Working With Carcinogens

1. Carcinogenic chemicals should not be used for purposes for which a satisfactory non-carcinogenic substitute is available.

2. The use of carcinogens for teaching purposes should be avoided. If it is considered that their use in a teaching procedure is unavoidable, the need for their use and the conditions of use must be reviewed annually. The written permission from the Head of School must be obtained before first use of any carcinogen for teaching and each year thereafter.

3. Work with carcinogens must be conducted in accordance with WRITTEN procedures which are derived from the risk assessment for the work. Risk assessments for work with carcinogens must always consider:
    - Processes which can produce aerosols or vapours containing carcinogen
    - Manipulation of carcinogenic gases, volatile carcinogens and compounds which decompose spontaneously evolving carcinogens
    - Weighing of carcinogens and the preparation of solutions containing them

- The possible effects of static electricity during handling of powders
- Changing traps and exhaust filters
- Response to a spillage or other uncontrolled release of a carcinogen
- Decontamination of work areas and equipment
- Disposal of waste

4. Carcinogens should be handled only in suitable and designated areas with adequate equipment for their containment.
    - Designated areas should be clearly marked
    - Access to designated areas should be restricted to those carrying out the work
    - The numbers of those involved in the work and entering the designated areas should be kept as low as possible
    - Effective methods must be devised to ensure people not involved in the work do not enter designated areas

5. If small samples of carcinogenic materials need to be taken to non-designated areas (e.g. for specialised analysis), samples should be clearly marked as carcinogens and be carried in robust, sealed containers. The same stringent precautions as are required in designated areas should be observed in non-designated areas.

6. Carcinogens should be kept segregated from all other chemicals in a locked cupboard clearly labelled “chemical carcinogens”. Keys may be held only by authorised people.

7. Protective clothing required should be specified and work at all times.
    - Protective clothing must be disposable and must be disposed of in the same manner as the carcinogen itself
    - Contaminated clothing must not be sent for laundering. Any procedure which causes of contamination of protective clothing is unsatisfactory and must be improved.
    - Protective clothing which has been won in a designated area is potentially contaminated and must not leave the designated area, except for disposal

8. Standards of personal hygiene in any laboratory should always be high. When working with carcinogens it is particularly important to ensure that the highest standards are maintained.
    - No eating, drinking or applying cosmetics is permitted in the laboratory
    - There must be no mouth pipetting
    - Any exposed cut or abrasion of the skin must be covered with an appropriate surgical dressing before commencing work or putting on protective clothing
    - Hands should be washed and dried with disposable towels before leaving the laboratory

9. Decontamination methods for experimental residues and laboratory equipment should ensure complete chemical conversion into non-carcinogenic substances. Written instructions for cleaning and decontamination of equipment must be prepared. Decontamination and cleaning of equipment should be carried out in a designated area.

10. Written procedures for disposal of waste must be prepared. Contaminated material which cannot be decontaminated should be double bagged in sealed plastic bags,

clearly labelled with contents and carcinogenic nature of hazardous substances and then disposed of by licensed waste contractors.

11. Any sharps (e.g. needles, broken glass) must be placed in plastic sharps containers for disposal by incineration.

5.0 References

Document Number	Document Name
HS-PO-002	COSHH Policy
HS-SF-003	COSHH Assessment Form