



Guide to Good Lab Practice The Basics

Moodle supporting guide

University of Warwick

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Introduction.

The laboratory is a complex environment so good laboratory practice is essential if laboratories are to be safe places in which to work.

Everyone has a responsibility for safety. The UK regulatory framework places the responsibility for managing risks on those who create and work with those risks.

1. Responsibilities

Everyone has responsibility to themselves and others to know and understand what they are doing to assess risks, to use suitable control measures – to gain competence which supports their activities and roles.

The H&S Executive definition of a competent person is “A competent person is someone who has sufficient training and experience or knowledge and other qualities that allow them to assist you properly”. Part of gaining the required knowledge and experience is knowing your limitations and asking questions when presented with a task you do not fully understand. For instance, you have been asked to prepare some dilute acid solutions. Would you know the correct safe method to carry out this task?

1.1 Principle Investigators

Accountable for assessing and addressing risks associated with their research. They need to ensure that those working for them are competent for the research work they carry out by ensuring they receive sufficient information, adequate instruction, training and supervision and by developing lab rules for the areas for which they have responsibility.

1.2 Researchers

Researchers need to work safely and comply with relevant legislation. They also need to follow University, departmental and lab rules, carry out risk assessments to develop controls and must read and understand other local departmental arrangements, including materials in local information and induction booklets

1.3 Technical Support / Facilities Management

Do not get involved in and are not responsible for research activity. Their role is to ensure that the facilities and its equipment are fully operational. They will organise repairs when necessary.

1.4 Visitors, contractors and non-laboratory personnel

The university operates a ‘permit’ system to grant access to visitors and contractors. The PI or their nominated person is responsible for ensuring that only authorised persons gain access to their research areas. The visitor / contractor must abide by the local rules.

2 General Laboratory Safety

There are many categories of hazards that might be encountered in a laboratory setting, and situations can change frequently. Even after you have identified and controlled all current risks, it is vital that you remain open to the possibility that new unexpected dangers can arise. Ensure your assessment covers chemicals (chemicals being used and chemicals that could be created from the

work you will be performing), flammable solvents, biological reagents, gases, equipment being used, others working in the space etc.

Review the controls measures regularly to ensure they remain adequate for risks encountered / being created.

2.1 Before entering the laboratory

Familiarise yourself with the local rules. These will normally be in the form a notice board at the entrance to the lab which indicates the basic minimum requirements. This can include details of PPE requirements, specific access requirements e.g. no pace makers etc.

Preparing for Lab Work

- Before starting to work in a laboratory, familiarise yourself with the following:
- The Safety Data sheet for any materials you are required to handle
- Pay particular attention to the sections on handling and storage; exposure controls and accident release (spillage).
- There is Guidance on how to interpret Safety Data Sheets on the H&S website.
- The location of safety and emergency equipment such as fire extinguishers, eye wash and shower, first aid and spill response kits, fire alarm activation points, telephone and emergency exits
- Emergency spill response procedures for the materials you will handle
- Emergency reporting procedures and telephone numbers
- Designated and alternate escape routes

2.2 During laboratory work

Good Laboratory Practice - principles

- Please also refer to Departmental Laboratory Rules
- Use protective equipment as directed and **remove before leaving the laboratory**
- Wear your lab coat when your risk assessment requires it (required in all labs handling chemicals & biologicals);
- Where directed by the Safety Data sheet, wear appropriate gloves when handling materials and replace if damaged.
- Never pipette by mouth, use pipette fillers.
- Tie back long hair
- Remove gloves before leaving the lab and do not touch your face when wearing gloves.
- Cover any cuts and grazes
- Use appropriate eye protection when directed (all laboratories using chemicals are classed as eye protection zones).
- Wear 'sensible' shoes in the laboratory – not open toed sandals or flip flops
- Never eat, drink, smoke or apply cosmetics in the laboratory.
- Wash hands before leaving the laboratory and apply a suitable hand moisturiser.
- Keep work area clean and tidy – including fume and safety cabinets
- Keep personal items in the storage area provided, not on benches or in gangways
- All chemical reactions are carried out in fume cabinets. Biological safety cabinets are required when determined by risk assessment.

Using Fume Cabinets.

- All chemical reactions must be carried out in a fume cabinet
- Keep the interior tidy. **Do Not** block the rear air vents

- Keep reactions / work and chemicals at least 15 cm inside the front of the cabinet
- Large pieces of equipment restrict air flow, use lab jacks to maintain dynamic flows
- Wear appropriate PPE
- Keep the sash down as far as comfortable while working
- Do not put your head into the cabinet while working
- Ensure lightweight items such as tissues, disposable gloves and filter papers are not drawn into the hood ducts
- Only items which are required for the current experiment should be available. All other items should be removed to their appropriate storage location.
- Keep sash closed when the cabinet is not actively in use
- Always close the sash at night

Daily 'User' checks

Daily user checks are essential. Check

- Sash running smoothly and auto-descend operates (where fitted)
- Air flow is good – check indicator on cabinet
- Lights working
- Fire Trace pressure gauge in the 'green' (where installed)

2.3 Before leaving the lab

- Perform a safety check at the end of each experiment and before leaving the lab. Make sure to:
 - Isolate services / supplies are necessary.
 - Return unused materials, equipment and apparatus to their proper storage locations
 - Dispose of all waste appropriately using the correct waste streams. Where necessary label materials and ensure the SDS is available. Departments will have local waste management arrangements which must be followed.
 - Remove defective or damaged equipment immediately, and arrange to have it repaired or replaced
 - Decontaminate any equipment or work areas that may have been in contact with hazardous materials.
- Leave behind protective clothing (lab coats, gloves, etc.) when leaving the laboratory
- Where required display 'Continuous Running' and/or 'Overnight Reaction' cards for on-going experiments
- Close the door and ensure the laboratory is secure if you are the last one to leave

Other Laboratory Hazards

As well as the hazards presented by chemicals in use in a laboratory, there are other hazards which also need to be considered:-

2.5a Glassware

The most common laboratory incidents involve handling glassware. The resulting injuries can be cuts, burns and even poisoning when cut by contaminated glassware. These can be avoided by following a few simple rules when handling glassware and ensuring the correct type of glass is used for the activity. Ensure you have received proper instructions before you use glass equipment designed for specialised tasks.

Here are few safety rules:

- Wear appropriate gloves when handling glassware, ensure they offer grip and cut resistance.
- Store glassware carefully so as not to damage it or yourself.

- When inserting tubing into the side arm of a flask, condenser etc., and grease or wet the tubing. (acetone works well on vinyl tubing). Ensure the tubing is the correct diameter.
- When removing the tubing from glassware, do not attempt to pull it off.
 - Lay the glass item on the lab bench (if possible). Cut the tubing near the end of the glass. Always cut away from your body
 - Next, slice the tubing lengthwise and slide the material off the glass connection.
- Substitute plastic connections for glass whenever possible to decrease the risk of injury.
- Use glassware for vacuum work that is designed for that purpose.

2.5b Heating Devices

Ensure all equipment is fit for purpose and maintained. Portable electrical equipment will display a sticker to indicate when it was last checked for electrical safety. Carry out a pre-use check and test any safety devices before using and don't use any equipment that is damaged. Heating devices include:

- Hotplates
- Tube & Box Furnaces
- Heating Mantles
- Hot-Air Guns
- Oil Baths
- Improper use of any one of these could result in fire or burns to the user.

All reactions must be carried out in a fume cabinet

Always turn off the equipment when no longer required.

2.5c Vacuum Systems

- Familiarise yourself with the operations of the vacuum system in use.
- Make sure you have the correct types of vessel / glassware for the level of vacuum being created.
- Ensure that glassware is plastic coated / meshed or that there is a physical barrier between you and the glass. Often the sash of the fume cupboard will provide this protection.
- Always use a trap on the suction line to prevent liquids from being drawn into the pump.
- If gases or vapours are being drawn through the pump, a cold trap should be used in the suction line to prevent contamination of the pump oil.
- Place a tray under the pump to catch any oil drips.

2.5d Gases

Compressed gas cylinders

- You must be trained to handle cylinders and how to attach the correct regulator before handling any gas cylinder.
- The gases contained in the cylinder can present a range of hazards, toxic, corrosive, asphyxiant, oxygen enrichment etc.
- You must be trained to handle Liquid gases.
- The space in which they are used may need specialist monitoring systems.
- Ensure any risk assessment for the space is adhered to and your risk assessment of the activity covers these materials where necessary.

There may be other laboratory hazards such as biological reagents, extremes of temperature, volatile materials. All these hazards need to be covered by your assessment for the activity you are planning.

3 Risk assessment

Risk is a part of everyday life and you are not expected to eliminate all risks. What you must do is make sure you know about the significant risks and the things you need to do to manage them to an acceptable level. Generally, you need to do everything 'reasonably practicable'. This means balancing the level of risk against the measures needed to control the real risk in terms of money, time or trouble. However, you do not need to take action if it would be grossly disproportionate to the level of risk.

Therefore, assessments need to be carried out for the hazards likely to be encountered which need to determine how likely it is that harm will occur; i.e. the level of risk, and the controls that are required to mitigate those risks.

For the purposes of this guidance we are focusing on chemical safety assessments, as required under the 'Control of Substances Hazardous to Health regulations' (COSHH) and 'Dangerous Substance's & Explosive Atmosphere Regulations' (DSEAR).

Control of Substances Hazardous To Health Regulations (COSHH)

Why controlling potentially hazardous materials matters

Using chemicals or other substances at work can put people's health at risk; the University needs to ensure that work is carried out in a manner which is sufficiently controlled to prevent ill health.

What are substances hazardous to health?

- Anything harmful by inhalation, ingestion or by skin contact, including;
- Anything carrying a warning label indicating toxic, harmful, corrosive or irritant;
- Substantial quantities of dust;
- Biological agents;

All of the above are covered by (COSHH) and requires a specific assessment of the activity involving the use of hazardous substances.

Essential information about hazardous substances is available on the Safety Data Sheet Use this information to help with the assessment. [Click for help with SDS Sheets.](#)

What an Assessment Requires

| | |
|--------|--|
| Step 1 | Assess the risks |
| Step 2 | Decide what precautions are needed |
| Step 3 | Prevent or adequately control exposure |
| Step 4 | Ensure that control measures are used and maintained |
| Step 5 | Prepare plans for accidents, incidents and emergencies |
| Step 6 | Ensure individuals are properly informed, trained and supervised |
| Step 7 | review |

Step 1: Assess the Risks

Identify the hazardous substances and the reactivity, fire and explosion, health and environmental hazards – use the information provided on the safety data sheet. Always consider the use of a less hazardous alternative where possible, or consider an alternative method which does not require hazardous substances.

Step 2: Precautions

Most of our use of hazardous substances is in laboratories. For most uses, standard precautions (including the use of appropriate laboratory PPE and safe handling practices including working in LEVs) if they are applied in full, will ensure adequate control. Details of standard precautions can be found in [appendix 1](#)

Sometimes it will not be possible to work within the conditions of standard precautions, or there will be a special reason why they are not fully applicable. Examples are: use of volatile harmful substances (other than trivial amounts) in the open lab rather than a fume cupboard or enclosure; or use of substance with special first aid requirements such as cyanides or hydrofluoric acid. In these cases and for all uses of respiratory sensitisers (asthmagens) or carcinogens, mutagens and teratogens, a specific assessment is required.

Step 3: Prevent or adequately control exposure

COSHH is not a paper exercise – the purpose of COSHH assessment is to ensure that the right precautions are identified and implemented.

The COSHH Regulations require you to prevent exposure to substances hazardous to health, if it is reasonably practicable. You should consider the general principles of prevention; Hierarchy of hazard control when carrying out your assessment. The hierarchy are listed below, in order of decreasing effectiveness:

- i. Elimination – do the task another way
- ii. Substitution – use a less hazardous material, substitute powders for pellets
- iii. Engineering – e.g. local exhaust ventilation (LEV) fume cabinets
- iv. Administration – following procedure, training and instruction
- v. Personal protective equipment – where adequate control cannot be achieved by any other means – e.g. lab coat, safety spectacles.

Substances causing asthma or cancer - For carcinogens, because no safe threshold exists, a stricter standard than “adequate control” applies. The obligation is to avoid or reduce exposure so far as is reasonably practicable. Substances causing asthma have joined the same legal framework for tight control as carcinogens. These substances include laboratory animal excreta/secretions as well as all substances with the warning on the container “may cause sensitisation by inhalation”. Details of which substances are covered can be found by consulting the HSE publication “Asthmagens?”. Where the substance is subject to a workplace exposure limit (WEL), this limit should not be exceeded. A list of WEL’s can be found on the HSE website. In cases of doubt, the Health and Safety Department can support atmospheric measurements to check levels. Details of work with asthmagens and carcinogens should be given to Occupational Health (see Section 8, below).

Step 4: Ensure that control measures are used and maintained

The University is required to see that control measures and safe systems of work are actually used. This is why it is necessary to provide information, training and supervision (Step 6).

Principle Investigators / Supervisors should monitor that all work is properly assessed – i.e. that either the use of standard precautions is recorded or there is a specific assessment – and that the controls assessed as necessary are actually implemented.

Individuals are required to use control measures and safe systems of work, and to report any defects forthwith.

Controls should be maintained. Local exhaust ventilation is tested annually by the University. Respiratory protection (RPE) other than disposables requires a monthly check. A card should be kept with the equipment showing:

- name of department;
- particulars of the equipment, with distinguishing number or description;
- date of monthly examination and initials of the person carrying out the check;
- condition of the equipment and filter including any defect found;
- for air-fed equipment, details of pressure and flow rate.

Step 5: Prepare plans for accidents, incidents and emergencies

In carrying out specific assessments, consider whether the emergency procedures in standard precautions, section 6 are sufficient and expand if necessary.

Step 6: Ensure individuals are properly informed, trained and supervised

It is a departmental responsibility to ensure that individuals are properly trained, i.e. are competent to do work with substances hazardous to health. Individuals should be told how to work safely and why they should work safely. They should be given the necessary information about the individual substances they are working with, and should sign the acknowledgement on the specific assessment form. Supervisors should visit them regularly to check they are working safely.

Step 7. Exposure Monitoring

COSHH requires that, in appropriate cases, exposure to substances hazardous to health is monitored, e.g. by atmospheric sampling. Control measures should normally be sufficiently robust as to ensure a comfortable margin of safety and should not normally require exposure monitoring. However, when volatile harmful materials are used in the open, in other than trivial quantities, monitoring may be necessary to determine whether precautions are adequate. For advice on exposure monitoring, contact the Safety Adviser.

Note: "Exposure monitoring" is different from the monitoring that safe systems of work are actually being used which is required in all cases (**see Step 4, above**).

Step 8. Health Surveillance

The COSHH Regulations state: "Where it is appropriate for the protection of the health of his employees who are, or are liable to be, exposed to a substance hazardous to health, the employer shall ensure that such employees are under suitable health surveillance".

The objectives of health surveillance are to detect early signs of adverse health effects, to help evaluate control measures and to collect data to evaluate hazards. Where control measures successfully reduce exposure to a level which prevents adverse health effects, no health surveillance is needed. A specific assessment is necessary before any decision with regard to the need for health surveillance; it should identify whether there is any risk of adverse health effects and if so who is at risk. Currently health surveillance is undertaken for work with respiratory sensitisers and latex.

If it is thought health surveillance needs to be investigated (e.g. if working with a respiratory sensitiser) please contact Occupational Health, sending a copy of the specific assessment.

Common misconceptions of COSHH

"COSHH says you have to assess every substance hazardous to health"

Wrong! *COSHH says you have to assess every activity using substance hazardous to health. Getting the suppliers' data sheet is not enough (although it's a good start). You have to look at the actual use of the substance.*

"We'd better cover ourselves by overstating the precautions to be taken"

You might be making a rod for your own back. When the extent of the risk is unclear it may sometimes be easier to take strict precautions – e.g. working in a fume cupboard – rather than spend

a long time researching an assessment; but NEVER state precautions which you don't intend to follow

“Most work uses standard precautions so it’s not a problem”

Standard precautions are not a soft option. They are a set of strict precautions which apply when using a range of substances, some of them very hazardous, (including, for example, use of eye protection where splashing is possible).

Dangerous Substances under explosive atmospheres regulations (DSEAR)

Dangerous substances are any substances used or present at work that could, if not properly controlled, cause harm to people as a result of a fire or explosion or corrosion of metal. They can be found in nearly all workplaces. These materials must be covered in assessment of both storage and use of hazardous materials as briefly mentioned in the [COSHH section](#).

The storage and use volumes below are the maximum allowed in a laboratory space. If the work or storage requirements exceeded this, a DSEAR assessment will be required.

- 50 litres of highly flammable liquid
- 250 litres of flammable liquid.
- The above stored in any one laboratory, stored in a metal cabinet conforming to BSEN 14470-1:2004
- 500 ml working volume (on open bench)
- Where any of these volumes is exceeded a DSEAR assessment is required.

4 Hazardous substances, Storage, labelling & information

Poor or incorrect chemical storage practices can lead to inadvertent reactions between incompatible materials with the potential to cause harm, fire or even explosions. Unstable substances may form during chemical storage, or prolonged storage, and appropriate measures need to be taken to prevent this happening e.g. certain ethers, alcohols and aldehydes can form peroxides that can detonate during distillation.

Ensure all chemicals are stored by hazard and compatibility and in appropriate cabinets where necessary.

Further information on the subject can be found on the H&S web pages.

4.1 General Storage Guidelines

- Do not block access to emergency safety equipment such as fire extinguishers, eyewashes, showers, first aid kits or utility controls such as breaker boxes or gas shut-off valves
- Avoid blocking exits or normal paths of travel: keep hallways, walkways and stairs clear of chemicals, boxes, equipment and shelf projections
- Ensure that the weight of stored material does not exceed the load-bearing capacity of shelves or cabinets
- Ensure that wall-mounted shelving has heavy-duty brackets and supports and is attached to studs or solid blocking. Regularly inspect clamps, supports, shelf brackets and other shelving hardware
- Arrange items so that they do not overhang or project beyond the edges of shelves or counter tops
- Do not stack materials so high that stability is compromised

- Leave a minimum of 18 inches (45.7 cm) of clearance between sprinkler heads and the top of storage
- Use a safety step or stepladder to access higher items; never stand on a stool or a chair

4.2 Chemical Storage

- Store hazardous chemicals in an area that is accessible only to authorised laboratory workers
- Minimise quantities and container sizes kept in the lab
- Do not store chemicals in aisles, under sinks or on floors, desks or bench tops
- Store chemicals away from sources of heat (e.g., ovens or steam pipes) and direct sunlight
- Never stack bottles on top of each other
- Do not store chemicals above eye level/shoulder height
- Store larger containers on lower shelves
- Store liquids inside chemically-resistant secondary containers (such as trays or tubs) that are large enough to hold spills
- Store chemicals inside closable cabinets or on sturdy shelving that has edge guards to prevent containers from falling
- Ensure that chemicals cannot fall off the rear of shelves
- Store chemicals by hazard group and compatibility and not in alphabetical order
- Designate specific storage areas for each class of chemical, and return reagents to those locations after each use
- Store volatile toxic and odorous chemicals in a way that prevents release of vapours (e.g., inside closed secondary containers, ventilated cabinets, paraffin sealing)
- Store flammables requiring refrigeration in explosion-safe or lab-safe refrigerators
- Label reactive or unstable chemicals (e.g., ethers) with the date of receipt and the date opened
- Inspect chemicals weekly for signs of deterioration and for label integrity
- Dispose of unwanted chemicals promptly through Hazardous Waste Management
- Keep inventory records of chemicals, and update annually
- Any materials that have been created, decanted or mixed must be labelled to reflect the hazards.

4.3 Flammable liquid storage cabinets

Flammable liquids should be stored inside flammable storage cabinets. Only those flammables in use for the day should be outside the cabinet. Guidelines for cabinet use include:

- Keep cabinet doors of the cabinet closed and latched
- Do not store other materials in these cabinets

4.4 Handling and Transport

- Large bottles of acids, solvents, or other liquids are carried in an appropriate carrier.
- Bottles should be carried one at a time with both hands, one on the neck of the bottle and the other underneath.
- Incompatible chemicals should not be transported in the same carrier.
- Chemicals to be moved between sites should be in original outer packages or protected from breakage or damage in a secondary container with sufficient absorbent material to contain a spill

4.5 [Safety Data Sheets](#)

SDS are key documents in the safe supply, handling and use of chemical and are the primary mechanism that suppliers and manufacturers use to communicate appropriate information regarding the safe use & storage of their products.

The data sheet should be arranged into 16 sections and has to provide certain information as prescribed under regulations. You may find that there are differences in how the information appears, but overall the information has to contain the 16 topics. Here we try to provide you with information on how to interpret that information

Important Note – A material safety data sheet does NOT constitute a risk assessment. It provides information for consideration when carrying out risk assessments. Risk assessment needs to take into account all the chemicals used and their interaction, not each chemical in isolation. When referring to a data sheet focus on the headings rather than the section numbers

4.6 [Labelling](#)

Labels are there to help identify hazardous chemicals, and explain what the hazards are and how to avoid them. Packaging is also important as it provides information on storage and disposal.

[Appendix 2 - CLP & Chip labelling](#)

5 [First Aid & Emergency Procedures.](#)

Please familiarise with the first aid and emergency procedures local to your department so that mishaps can be speedily contained.

- Find out who the first aiders are in your building.
- It is the responsibility of the injured person to report any injury or property damage.
- You can report any incidents via the online reporting page or to your line manager.

Where the materials being used have special first aid requirements, those providing the first aid must know and understand the relevant treatments.

5.1 [First Aid](#)

5.1a - [Wounds](#) - Cleanse area with water as appropriate. Small cuts and scratches place sterile pad over wound and apply gentle pressure evenly with the opposite hand. If direct gentle pressure does not control bleeding, raise the area above the level of the heart. Apply dressing plaster as appropriate. If there is significant bleeding place sterile pad over wound and apply gentle pressure and call Immediately for help and advice.

5.1b – [Thermal Burns](#) - First degree burns are characterised by redness or discoloration of the skin, mild swelling and pain. These can be treated by rinsing or immersing in water for at least 10 minutes and applying a skin cream as appropriate, and seeking further medical treatment as needed. Second and third degree burns are characterised by red or scalded skin with blisters (second degree), white or charred skin (third degree). Immediate first aid is to clean the area if possible and keep it dry and call for medical help immediately.

5.1c – [Chemical Burns](#) - If hazardous chemicals should come into contact with skin or eyes, follow the first aid procedures below.

- **Skin:** Remove garments as required and rinse the affected area with large quantities of water for at least 15 minutes (sink, shower, or hose). Do not apply burn ointments/spray to affected areas. Call for medical help without delay.
- **Eyes:** Rinse area of eyes, eyelids, and face thoroughly with lukewarm water for at least 15 minutes at the eye wash station and call for medical help without delay

5.2 Lone Working

Lone working is generally not allowed in a laboratory. (It is never allowed in undergraduate labs)
Where lone working may be required, this must be in agreement with your supervisor. Departments will have their own 'lone working' arrangements and these must be communicated and followed

APPENDIX 1. – COSHH STANDARD PRECAUTIONS

1. Identification and Hazard Information

Containers of chemicals should be clearly and permanently identified. When substances are transferred to smaller containers, the hazard warning pictograms on the container from which they are transferred should be put on the new container. Adhesive labels are available for this purpose from laboratory suppliers.

Workers should be aware of the main hazards of substances they are working with. Hazard data sheets should be obtained from the supplier if it is not already available. When substances are supplied to others, information on hazards should also be provided.

2. Precautions against Ingestion

Mouth pipetting is not permitted.

Eating, drinking, smoking and application of cosmetics are not permitted in laboratories where substances hazardous to health are used.

At the end of a session of laboratory work wash your hands.

3. Protection of Eyes

Eye protection complying with BS EN166 must be worn when working in any laboratory or in any area where chemicals are used which could harm the eyes if they splashed into them.

4. Protection of Skin

Do not wear sandals or open-toed footwear in the lab. For corrosive substances where there is any possibility of splashing onto the face, wear a full face visor. For all substances which are corrosive, toxic or harmful when they contact the skin, wear gloves suitable for the specific substance (for most chemicals, nitrile or acrylonitrile gloves are best) and a laboratory coat, buttoned up. For other substances accidental contact with the skin will be less harmful and may be dealt with by washing. Immersion or deliberate contact should be avoided; if it really appears necessary a **specific assessment** will be required and the Safety Adviser should be consulted first.

5. Precautions against Inhalation

So far as is reasonably practicable the inhalation of gaseous, volatile or dusty chemicals should be avoided by the use of enclosed apparatus, or use of a fume cupboard or other local exhaust ventilation. Where this is not reasonably practicable, work can still be done on the open bench with materials of low volatility/toxicity, or where apparatus is enclosed nearly all the time or the amounts used are very small. There is normally no inhalation risk to someone working normally at a fume cupboard where the sash is lower than the position marked (although it is good practice always to keep the sash down) or in other ventilated enclosures provided that work is confined to the use for which the enclosure was intended. A fume cupboard does not give absolute containment, and deliberate volatilisation of highly toxic materials, or the production of very high concentrations of toxic substances by aerosolisation or fast boiling should be avoided by appropriate apparatus and technique. If avoidance appears not to be possible a **specific assessment** is required.

Fume cupboards and other ventilated enclosures are required to be tested annually. A dated test label will be left. It is good practice to attach a small piece of tape to the bottom of the sash or apparatus as a visual indication of inward airflow.

Where work is assessed as acceptable in the open, care should be taken to avoid or reduce inhalation as far as is reasonably practicable by using good technique and avoiding breathing the atmosphere very close to the point of release of a substance.

6. Emergencies and Incidents

Users of substances hazardous to health should know what they would do in the event of a foreseeable emergency event.

6.1. Spillage

In the event of spillage outside a fume cupboard or local exhaust enclosure:

- * If the substance is flammable, eliminate sources of ignition;
- * Instruct others to keep at a safe distance;
- * Open windows where appropriate;
- * For spillage of **volatile** materials, evacuate the room and shut the door unless the substance has been determined to be safe to use in the open. Unless the spillage is one which may be left to clear by evaporation and ventilation, call the Fire Brigade.
- * For spillage of material which has been determined safe to use in the open, absorb it onto sand or proprietary absorbent, and transfer it into a container which is put into a well-ventilated space for ultimate disposal.

6.2. Toxic Gas Leakage

If a compressed gas is leaking and cannot be shut off, feed the gas if possible into a fume cupboard or other ventilation discharging directly to the outside. If this is not possible then for a small leak, where practicable, transport the leaking gas cylinder to the open air and clear the surrounding area. Otherwise evacuate the room, if possible opening windows before leaving.

6.3. First Aid

Workers should know what help to give before qualified help arrives on the scene.

The basic procedure is as follows: (does not apply to HF and cyanides))

Eyes

Flood thoroughly with water for at least 10 minutes. Use sterile eyewash or tap water from a clean container or run gently from a hose. Gently, but if necessary firmly, prise eyelids open. SEEK IMMEDIATE MEDICAL ATTENTION.

Skin

Drench with plenty of water. Remove contaminated clothing. Continue with running water for 10 minutes. Do not scrub or break the skin surface. Unless contact has been slight SEEK IMMEDIATE MEDICAL ATTENTION.

Lungs

Remove affected personnel from area of exposure, without putting yourself in danger (i.e. do not enter a room where the general atmosphere appears to be dangerous - call the Fire Brigade). Rest them and keep them warm. Unless exposure has been slight and the patient feels quite well, SEEK IMMEDIATE MEDICAL ATTENTION.

Mouth

DO NOT INDUCE VOMITING OR GIVE ANYTHING TO DRINK. If the chemical has been confined to the mouth give large amounts of water as mouth wash - ensure mouth wash is not swallowed. SEEK IMMEDIATE MEDICAL ATTENTION.

6.4. Reporting

Report accidents and incidents online via safety website. Anyone who suspects that their health might have been affected by exposure to substances at work (including for example dermatitis or asthma) should contact Occupational Health.

7. Disposal

Ultimate disposal of waste should be part of the planning for any procedure.

Waste solvent should be disposed of into the containers provided for halogenated or non-halogenated waste. If it is contaminated with strong acid or alkali it should be neutralised before

disposal to prevent corrosion of, and subsequent leaking from, the metal drums into which waste solvent is eventually bulked.

Other waste chemicals should be clearly identified with hazard pictograms on the container as appropriate. Unless the waste can be rendered harmless in-house, application should be made to the waste chemical disposal service stating the amount of chemical and its hazard. In some cases it will be necessary to treat the waste to make it less hazardous before the waste is accepted.

8. Training and Supervision

It is the responsibility of Heads of Departments and, where appropriate, of academic supervisors, to provide training and supervision to ensure, so far as possible, that individuals are competent and follow safe procedures.

APPENDIX 2 – CLP & CHIP PICTOGRAMS

| Hazard | New CLP Symbol | CHIP Symbol to be phased out |
|---------------------------|---|---|
| Corrosive |  |   |
| Acute Toxicity |  |   |
| Serious Health Hazard |  |   |
| Health Hazard |  |  |
| Flammable |  |  |
| Oxidising |  |  |
| Explosive |  |  |
| Gas under pressure |  | There is no existing symbol |
| Hazard to the Environment |  |  |