SECTION K: GENERAL CODES OF PRACTICE FOR LABORATORY WORK

These codes of practice are updated annually by designated members of staff with experience of the relevant protocols. It is expected that the practices described by these codes will be adhered to when conducting work in the Department. Specific training in these codes of practice is not required beyond the safety induction. Signature of the policy document indicates agreement to their terms.

Code of Practice A: Good Laboratory Practice

This section must be read thoroughly

1. Good Laboratory Practice (GLP)

You should pay particular attention to: cleanliness in communal work areas (Parts 6d to 6h); ensuring good ventilation during the transfer of liquids and rinsing with volatile solvents such as acetone (Part 6i); the use and disposal of metal sharps (Part 7); handling of gases (Part 8); and requirements to avoid eating, drinking and applying cosmetics (Part 6n).

The aim of Good Laboratory Practice (GLP) is the protection of people against the hazards of substances encountered at work and the maintenance of high standards of work and professionalism. This aim is achieved by appropriate means of hazard control and working practices. No work should be started until due consideration has been given to the means of minimising the hazards, through appropriate choice of chemical reaction, reagents, conditions, solvent, and management, *i.e.* risk and COSHH assessments have been completed and authorised. In addition, no new work should be introduced into a laboratory if it is not possible to adequately control the hazards within the existing facilities or until the necessary improvements have been made. The risks posed by work depend very much on the appropriateness and effectiveness of the arrangements and practice of the person(s) at work. Good and appropriate facilities can be ineffective or valueless if improperly used!

Specific procedures and relating to named chemicals, activities, equipment, *etc*. are issued separately as special codes of practice. A list of these documents is given in **Section L** of the safety policy.

Personal protective equipment (including gloves) is not a substitute for other control measures. The purpose of personal protection is normally to prevent **accidental** exposure to hazardous substances, and should be considered as the final level of protection.

Further information can be found on Health and Safety Services web site, **Health and Safety Guidance 9** (**UHSS Topic A-Z/COSHH**).

Section 2	is concerned with planning experimental work.
Section 3	is concerned with personal protection.
Sections 4–7	embody the protection of everyone.
Sections 8 & 9	are unclassified.

2. Planning and Recording Experiments

All laboratory work must be planned in advance, with consideration of avoiding unnecessary hazards, identifying the risks that are unavoidable, and determination of the appropriate control measures to minimise the risks. Details of the risk assessment and the subsequent work undertaken must be recorded. These records are the property of the University and will remain so at the end of the project.

(a) Plan in detail the work to be undertaken, taking account of the nature of the chemicals to be used, the conditions required for reaction, the most suitable equipment, the nature of the products and the waste materials. Also, consider possible actions in case of accidental spillage.

Experimental chemistry, including chemical reactions and vacuum distillations, should normally be carried out in a fume cupboard. Specific risk assessments should be undertaken if a fume cupboard is not used.

(b) All laboratory work **must** be recorded in a hardbound laboratory notebook or electronic notebook. Three different versions of paper notebooks are available from the Chemistry Stores, one more suited for synthetic work, one for measurements, and one for biological chemistry. All are available in 150 page or 50 page versions. For one-off experiments, that is, individual reactions or procedures that differ from one another, an individual risk assessment must be made and recorded for EACH experiment in these books. This assessment must consider the hazards to health posed by the materials to be used (COSHH), the risk of fire or violent/uncontrolled reactions (DSEAR) and other sources of risk posed by equipment use and operating procedures. Laboratory notebooks have space for both COSHH and procedure-based risk assessments. Reference to project risk assessments (forms CRA1/CRA2) may be made in laboratory notebooks using the user-generated reference for the assessment; in these circumstances, a copy of the project risk assessment should be appended to the notebook. Supervisors must countersign and date risk assessments **before** the work is started. If a reaction or process is deemed to have high risk, a separate more detailed risk assessment is required.

(i) The COSHH assessment must take account of the properties of all the chemicals to be used or generated, and the precautions which need to be taken. Consider less toxic alternatives.

(ii) Consider the worst-case scenario that could arise during the experiment, considering the sizes of the containers that are to be manipulated, not just the amount that is to be used or generated. Take precautions to ensure that measures are in place to deal with any problems. This should include consideration of spillage, unexpected exotherms or release of gaseous materials, and known chemical incompatibilities. Some of this information will be included in the safety data sheet (SDS) for each chemical, but other sources of information should be consulted, including Bretherick's Handbook of Reactive Chemical Hazards (available electronically at http://library.dur.ac.uk/record=b2873482~S1) and the UK Chemical Reaction Hazards Forum (http://www.crhf.org.uk/). The European

Chemicals Agency has a useful tool for obtaining agglomerated SDS information on chemicals and materials that is available at: https://echa.europa.eu/advanced-search-for-chemicals
The ACS provide a useful guide for identifying hazards in research laboratories which is available at: https://tinyurl.com/y9uyfgem

(iii) Consider waste products, and their disposal (see Section I). Gases should be efficiently scrubbed before venting to the atmosphere.

Where repeated experimental procedures are used, a project risk assessment should be used.

(c) **Sensitisers and Irritants**. A sensitiser is a chemical or material that can produce an allergic response following exposure. Sensitisation is an immunological response following exposure to a sensitiser. Once sensitised, individuals can have severe reactions to further exposure, even in small amounts. In the most extreme cases, after respiratory or skin exposure, individuals may develop asthma and/or dermatitis respectively. Contact dermatitis can also be caused by exposure to irritant materials. **Anyone who experiences any form of adverse reaction after using chemicals (including detergents, cleaning materials, and research chemicals) should inform their supervisor and Occupational Health**.

If chemical sensitisers are being used, *e.g.* if R42, H334 or H317 appears during a project COSHH assessment, or if a user of irritant materials has an existing condition such as atopic eczema or asthma, health monitoring may be required. The work will be subject to a specific risk assessment (UHSS Health and Safety Guidance 9; **UHSS Topic A-Z/COSHH**) and occupational health should be contacted to discuss any monitoring arrangements that may be required based on this assessment.

Schedule 6 of the COSHH legislation (2002) indicates that medical surveillance is appropriate for the use of the following: vinyl chloride monomer, nitro or amino derivatives of phenol, potassium or sodium chromate or dichromate, o-tolidine, dianisidine, dichlorobenzidine, auramine, carbon disulfide, benzene, carbon tetrachloride, trichloroethylene. Other Materials with high toxicity that produce cumulative effects, such as carcinogens, toxic metals and respirable crystalline silica may also require monitoring.

Further details are available on the Chemistry Safety webpages:
http://community.dur.ac.uk/chem.safety/local/Sensitisers.html

(d) Ensure that you have sufficient time available to supervise the experiment from start to finish, or to ensure that the experiment may safely be left unattended. For overnight reactions: tubing carrying water, *e.g.* for a condenser, **must** be secured with cable ties at both ends; a temperature regulator **must** be used if a reaction is being heated; and any reaction carried out above ambient temperature overnight **must** be stable at its regulated temperature for at least one hour before being left. See also **Section E, Part 2** of the Departmental policy.

(e) **Avoid heating sealed systems**. If you need to heat a sealed system a specific risk assessment is required.

(f) Work **must** always be carried out within the hearing of another proficient person. Research workers should be aware that at certain periods during normal working hours, such as graduation days or during seminars, there might not be another worker within earshot. In such circumstances, work **must not** be carried out.

3. Personal Protective Equipment (PPE)

(a) **Safety spectacles** must be worn all the time in designated laboratories, even when no work is being done. For most general laboratory applications, safety spectacles should meet the EN 166-F standard (capable of withstanding impacts against small objects travelling up to 45 meters per second). These offer some splash protection against chemicals, but do not have a seal to prevent, for example, liquids running down to the eyes from the forehead. Where there is a risk of material splashing at head height, either safer working practices should be sought (preferably), or otherwise eye protection of a different standard (*e.g.* goggles) should be used. For any laboratory activity, suitable eye protection should be identified in the risk assessment for that activity.

Very occasionally, the use of safety spectacles is not compatible with the work being undertaken, for example during the use of microscopes. In these circumstances other activities undertaken in the vicinity should be restricted such that the wearing of safety spectacles is not required for safe working. A risk assessment, together with a standard operating procedure or code of practice, should be prepared by the research group leader or facility manager or other person competent to authorise the work, and must be followed by all undertaking the work.

(b) **Laboratory coats**. A suitable laboratory coat or overall should be worn to protect personal clothing from contamination and should be changed before becoming excessively soiled. If protective clothing is liable to become heavily contaminated, a heavy-duty plastic or rubber apron should also be worn. In some instances, for example when handling pyrophoric materials, consideration should be given to the wearing of a flame-retardant laboratory coat. Chemistry Stores keep a small stock of these.

(c) **Gloves.** Hands at risk from mechanical injury (bruising, laceration, or extremes of temperature), and/or chemical exposure (including cleaning fluids), must be protected by gloves. The two principal routes by which hands may be exposed to chemicals in the Department are **immersion** (intentional direct contact with a liquid, *e.g.* in an acid or base bath) and **splash** (unintentional contact with a liquid, *e.g.* following a spillage). Appropriate gloves must be worn by anyone handling chemicals that are either hazardous to the skin or have properties that are unknown. It should also be noted that some solvents are able to carry solutes through the skin. Longer sleeved gloves (gauntlets) must be worn if the arms are also at risk of contact with chemicals. Consideration should be given to the chemical resistance of the glove material against the chemicals to which it will be exposed, the duration and frequency of exposure, and the precision of grip required.

(i) **The type of glove that should be used, and its compatibility with the chemicals involved, should be included in the risk**

assessment for a given procedure or experiment. This is especially important if the work involves immersion or if the risk to health from exposure is very high. **Some chemicals, most notably chlorinated solvents, can penetrate most standard glove materials**. In some cases, 'double gloving' can be used to afford extra protection. Consult **Appendix E** of the safety policy and glove manufacturers' specifications to select the correct glove.

(ii) Gloves that meet the EN 374-1 standard are classed as 'low chemical resistant' and only suitable for splash protection against chemicals. Gloves meeting the EN 374-3 standard are 'chemical resistant' and will give > 30 min before chemical breakthrough for at least 3 different non-halogenated solvents. A more detailed description of the chemical compatibility of gloves is given in **Appendix E**. **Safety data sheets normally provide details of recommended gloves**.

(iii) Chemistry Stores stock a range of gloves and gauntlets that provide protection against chemical, mechanical and thermal injury. Chemistry Stores can provide manufacturers' specifications for the hand protection products they stock.

(iv) For chemical protection, Chemistry Stores stock both **single-use** and **reusable** gloves. Other types of glove are available commercially if Chemistry Stores do not stock a suitable glove.

(v) **Reusable gloves** offer good protection for routine practices such as washing glassware, but poor grip precision. Chemistry Stores stock both natural rubber (yellow) and nitrile (green) marigold gloves with cotton flock linings and similar levels of chemical resistance. Although nitrile is often the first choice of glove material, both nitrile and natural rubber can provoke adverse reactions in some people (see also paragraph (xi)). You should avoid any glove material to which you are sensitive and seek medical help if you think a glove material is causing any adverse effects.

(vi) **Single-use gloves** offer good grip precision for more exacting manipulations and are available from Chemistry Stores in a range of materials. They should be discarded after one wearing.

(vii) Gloves should be checked for holes before use.

(viii) **Glove removal**. Before removal, reusable gloves should be washed in warm detergent solution (preceded by a specific cleansing agent, if necessary) and dried. It is essential that gloves are removed in a manner that does not transfer contaminants onto your skin. One glove should be used to remove the other. With disposable gloves it is best to turn them inside out as they are removed. Pictorial guides are available at:
http://www.hse.gov.uk/skin/posters/singleusegloves.pdf
http://www.hse.gov.uk/skin/posters/reusablegloves.pdf

(ix) Gloves should be removed before leaving a laboratory and **must not be used on door handles**. Biological chemistry workers are permitted to use the 'one-glove' rule, whereby one glove is kept on whilst transferring a sample between laboratories. Other exceptions may be applied for specific cases following discussion with a research supervisor. Whilst in the laboratory, gloves should be removed before handling objects that could transfer materials, such as telephones, pens and keyboards.

(x) **Manipulations of carcinogenic substances**. Gloves that have been exposed to an undiluted carcinogen or toxic substance should be

treated with a chemical that destroys the contaminant, or placed in a thick polythene bag, and disposed as contaminated waste.

(xi) **Latex (Natural Rubber) Gloves**. All use of gloves that place latex in direct contact with the skin should be avoided and appropriate glove alternatives sought. If unavoidable, the use of disposable latex gloves must be subject to an individual, additional risk assessment, in which justification for the use of these products is specified. The use of powdered and/or high protein content latex gloves is forbidden due to the increased risk of sensitisation and allergic reactions associated with these gloves.
Further information can be found on the HSE website:
http://www.hse.gov.uk/skin/employ/latex.htm

(xii) For more information about protecting skin at work, visit:
http://www.hse.gov.uk/skin/index.htm

(d) **Footwear** worn in laboratories should incorporate flat heels, slip resistant soles and uppers that fully enclose the foot.

(e) Outdoor clothing and personal effects including food and drink should not be taken into a laboratory. Secure lockers or offices are provided outside the laboratory for the storage of these items.

(f) Eye protection and suitable footwear with toe protection **must be worn (and gloves if necessary)** when handling heavy objects, such as gas cylinders, or filling and transporting containers of cryogenic liquids. Safety spectacles and suitable footwear **must be worn** when changing gas cylinders and cylinder heads.

(g) Since the principal method for the control of airborne hazards is to contain the substance, respiratory protection should only be necessary in emergency situations. The use of respiratory protection must be discussed with the Department Safety Coordinator/University Health & Safety Adviser so that the correct type is used, changed and maintained.

(h) **Before leaving the work area** it is most important that hands are washed and all protective clothing removed. **Nobody should wear a laboratory coat in a general circulation** (tea/coffee room; canteen or the central and reception offices) **or office area**.

(i) Protective clothing contaminated with hazardous substances will require special laundering arrangements. Laboratory coats and towels can be taken to the stores at designated times to be sent for cleaning.

(j) All personal protective equipment should be stored in a location that minimises both the risk of chemical contamination of the equipment during storage, and the risk of contaminated equipment transferring materials to locations outside the laboratory.

4. Storage of Chemicals

Recommended storage of liquid chemicals in the laboratory:

(a) The quantity of flammable solvent allowed in each laboratory is normally limited to 50 litres. When not in use, these solvents must be kept in fire-resistant metal cabinets that are able to contain spillage. (Checks are made by Dr Philip Dyer, Dr John Sanderson and Dr Eckart Wrede in the inorganic, organic and physical laboratories respectively).

It is particularly important to ensure **all** solvent Winchesters are placed in these cabinets when not in use, **and** when the laboratory is unoccupied.

During the course of 2019/20, a new form for laboratory doors will come into effect that will detail the volume of solvent in each room and a justification for quantities > 50 litres.

(b) Non-flammable solvents and chlorinated solvents should be stored separately from flammable solvents.

(c) Acids should be stored separately.

(d) Alkaline materials should be stored separately.

(e) Peroxides, *e.g.* hydrogen peroxide, should be stored separately and away from carbonaceous material if possible and in plastic containers. Strong oxidising agents can react explosively with acids, flammable liquids, metals and their salts.

5. Fume Cupboards

Fume cupboards are a control measure designed to capture and remove air-borne hazardous substances generated during laboratory experiments. Fume cupboard provision and use is covered by the COSHH Regulations 2002 (as amended) and the Provision and Use of Work Equipment Regulations 1998 (PUWER). It is essential that users understand how to use them effectively, and that they are maintained, inspected and tested by competent persons.

General Points:

(a) Work with substances that produce or generate toxic or harmful fumes, vapours, gases, dust or chemical aerosols should be carried out in a fume cupboard to eliminate or reduce the risk of exposure to an acceptable and safe level. Any material with a workplace exposure limit (WEL) documented in the SDS should be used in an appropriate fume cupboard.

(b) Every fume cupboard must have an annual face velocity test. For ducted cupboards that are part of the building infrastructure, this is normally arranged by Estates and Facilities. However, individuals may need to arrange their own tests for temporary or free-standing cupboards that are not maintained by Estates and Facilities. **Cupboards that fail the face velocity test will be marked as failed and must not be used until the failure has been rectified**.

(c) Most fume cupboards have a monitor to provide an indication of normal function. This may take the form of a simple indicator light (red/green) or a flow monitor. **Flow alarms must not be deactiviated when a cupboard is in normal use**.

(d) A cupboard with insufficient flow will usually be indicated either by a red light or low velocity measure. Visual alarms are usually accompanied by an audible alarm. If a cupboard is failing to give sufficient flow, first ensure that the sash is closed sufficiently and that there are no major obstructions inside the cupboard that could hinder flow. If poor or failing performance cannot be resolved, the matter should be raised with Paul Hofmann.

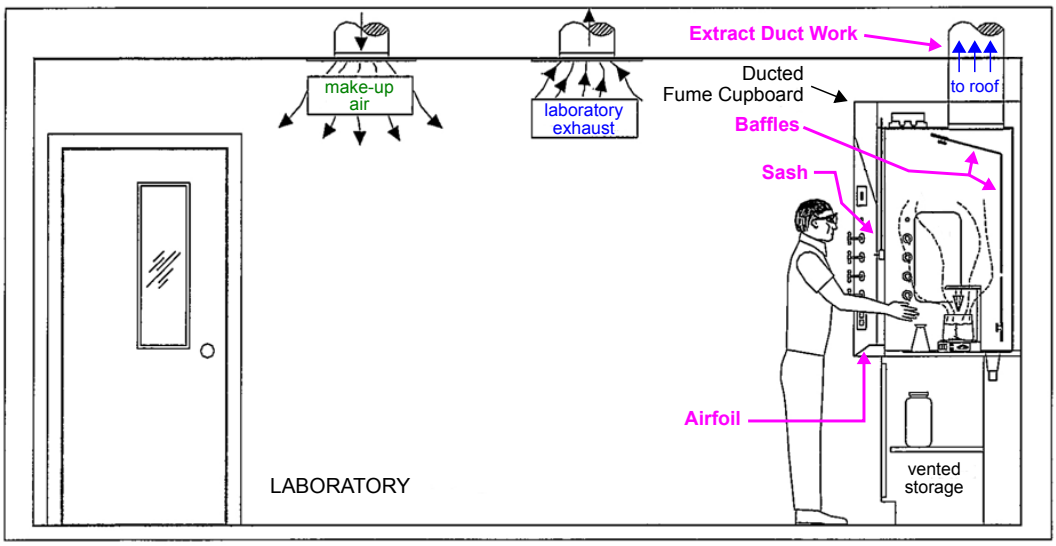
(e) Because of the risk of mixing between fumes and respiratory air, the traps in the drains for waste water in all sinks should be kept full of water. It is good practice to run water down all sinks at least once each week. Smells detected in corridors and other non-experimental areas must be reported immediately to Mr Unwin (CG137B) and an incident report form filed if judged necessary.

(f) Users must be trained in the correct use of fume cupboards, including the matters described above and the correct sash height, the optimal working area, emergency procedures and good housekeeping.

(g) Ducted fume cupboards in synthetic laboratories must NOT be used for the containment of biological materials. Where such containment is required a microbiological safety cabinet must be used.

Fume Cupboard Operation:

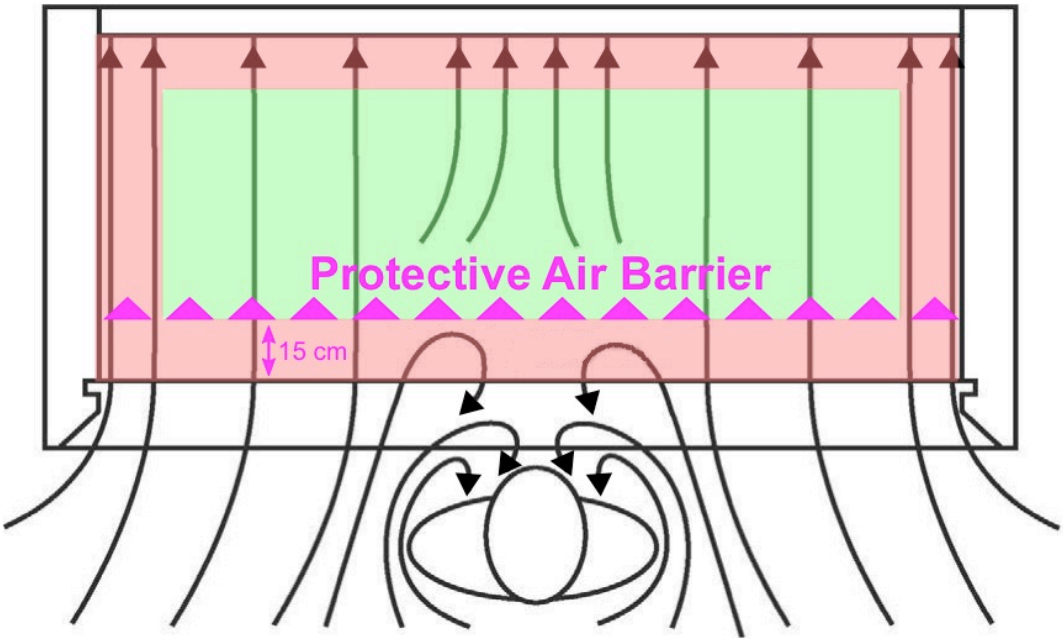
(h) Ducted fume cupboards are integrated within the air management of the building:



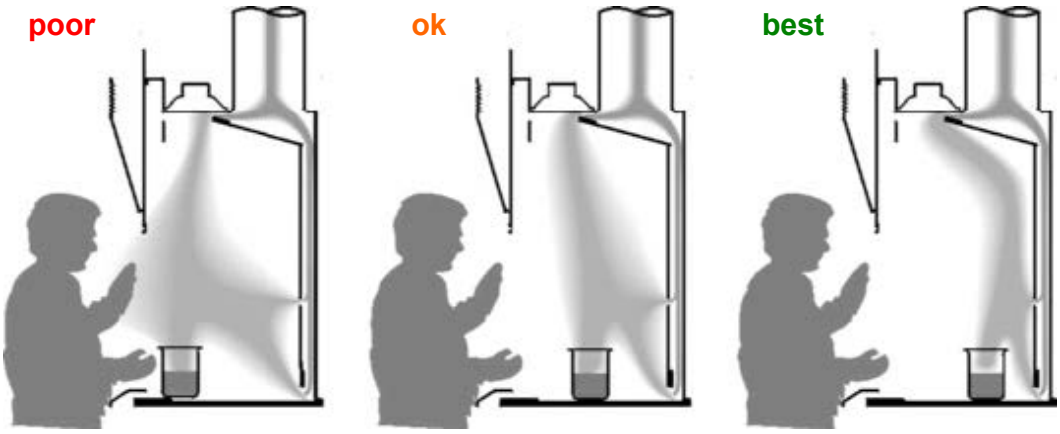
They operate by drawing in laboratory air to contain and dilute the contents before discharge without filtration 3 m above roof level. Ducted fume cupboards either work at constant air volume (*i.e.* as the sash is raised the air current decreases and *vice versa*) or constant face velocity. Fume cupboards have a sash (the transparent screen between the user and the work space), baffles (panels within the cupboard to optimise air flow), an airfoil (along the bottom and sides of the cupboard to reduce turbulence and allow operation at low sash heights), a work surface, and extract duct work.

(i) Recirculating filtered fume cupboards are designed to reduce the airborne concentration of a defined range of chemical vapours, fumes, smells and dusts in the air to acceptable levels. Materials suitable for use in a recirculating fume cupboard are determined by the nature of the filters and the specifications of the cabinet. All filtered cabinets should have a label to indicate the dates of the last filter change and when the next one is required. **A cabinet must not be used if the filter is out of date**.

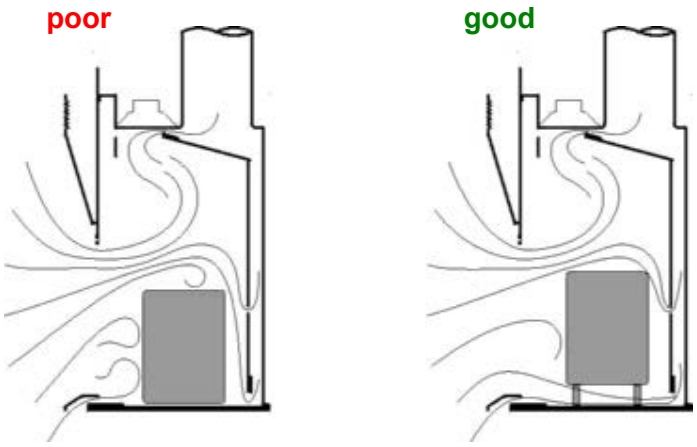
(j) A protective air barrier for a safe work area is formed by the air flow into the cabinet. When a worker stands directly in front of the cupboard, an area of low air pressure is formed in front of the user. This zone of low pressure extends into the fume cupboard for approximately 10 cm. Objects placed on the sides and back of the cupboard also hinder normal flow. **In order to ensure safe working a 15 cm wide 'unobstructed zone' should be maintained between all sides of the cabinet**:



(k) Most of the air entering a fume cupboard travels across the work surface and behind the baffle at the back. **Do NOT block the back baffle opening just above the base.** Optimum protection is offered approximately 15 cm in front of the baffle:



(l) If it is absolutely necessary to store material or instruments in the cupboard, a shelf or legs should be used to raise the obstruction by at least 5 cm to allow airflow underneath to the baffle opening:



(m) The floor area in front of a fume cupboard must be unobstructed with furniture or equipment that may interfere with the performance of the fume cupboard.

(n) All chemicals placed inside a cupboard must be clearly labelled. Do not allow waste materials (*e.g.* solid waste bags, waste solvent bottles) to accumulate. Do not leave objects in the fume cupboard that are not required for the current experiment(s).

(o) Before using a fume cupboard, the user must check as far as possible that the cupboard is fit for purpose (*i.e.* the inner 'unobstructed zone' is clear, there are no obstructions in front of the cupboard, air flow is as expected, the cupboard has an in-date face velocity test, and the cupboard is appropriate for the work to be undertaken, in line with the risk assessment).

(p) The sash should be lowered whilst an experiment is in progress and the fume cupboard is unattended. Fume cupboards with horizontal sliding panes should be used with the sash all the way down, with as small an open area as possible.

(q) **Never put your head inside the fume cupboard enclosure at any time whilst hazardous substances are present.**

In the Event of an Emergency:

(r) if the air flow fails, make the contents as safe as possible and stop work. Pull the sash as low as it will go and label the front of the cupboard to indicate that it has failed. Notify other workers in the vicinity if there is an on-going risk from hazardous materials. Notify Paul Hofmann of the failure.

(s) Deal with spillages promptly in line with the emergency measures in Section B of the Departmental policy.

(t) Fires must be treated with caution. When using a CO_2 extinguisher, care is needed to avoid ejecting the contents of the cupboard into the laboratory

or sending flames into the duct work. Safe deployment can often be achieved by directing the extinguisher at the top of the cupboard. If a fire cannot be controlled, close the sash and raise the alarm in line with the emergency measures in Section B of the Departmental policy.

6. Handling of Chemicals by Individuals

(a) Do not inhale vapours or make skin contact with any substances.

(b) Pipetting by mouth **is not allowed**. Use a bulb or automatic pipette.

(c) Direct contact between a chemical and the body must be avoided. Since most experiments use **measured** amounts of materials, good practice in the weighing area is essential to avoid spillage and/or accidental contact.

(i) **SOLIDS** (except very toxic solids)

Transfer of solids to a weighed stoppered container must be carried out on an adjacent bench covered with paper which can be removed and, if spillage has occurred, be disposed of as solid waste.

(ii) **TOXIC LIQUIDS, FINE POWDERS, AND VERY TOXIC OR VOLATILE SOLIDS**

Transfer of material and any adjustment to the amount of material into a pre-weighed stoppered container must be carried out in a fume cupboard. Place the balance in the fume cupboard where possible. This avoids contamination of the weighing area. Pipettes used to transfer the liquids must be washed with an appropriate solvent into the correct "Waste Solvents" bottle - in the fume cupboard. Spatulas used to transfer solids must be cleaned in the appropriate way.

(d) Experiments must be conducted on scrupulously clean working surfaces. (Should any subsequent spillage occur, there is at least the possibility of 'mopping up' for the recovery of materials). This requirement applies particularly in **fume cupboards** where most work is carried out. A high standard of tidiness must be maintained at all times. The use of trays/containment vessels is recommended.

(e) Contaminated surfaces and equipment must be cleaned as soon as is practicable after use. The equipment should then be **put away**. Do not clutter bench-space with unused equipment and bottles of chemicals.

(f) Chemicals not in use should be returned **promptly** to their correct storage container. Please note especially: stock bottles of flammable solvents (including "Wash" acetone) **must be returned immediately** to the fire-resistant metal cabinet after use. It is important to ensure that solvent bottles are not filled above the shoulder of the bottle as small changes in temperature can have a catastrophic effect on overfilled bottles.

(g) Containers or bottles containing ≥ 100 ml or 100 g of material and all containers of hazardous materials **must** be transported in special carriers. When transporting materials in carriers, the lift should be used to move the

carriers between floors. Personnel **must not** travel in the lift with chemicals, gases, or other dangerous materials. Each lift contains a yellow bollard that should be used to warn other personnel that the lift is being used to transport materials and should not be entered. The correct handling equipment should be used to transport and manipulate cans, drums and gas bottles.

(h) Do not leave bottles of chemicals, Dewars or other items on floors where they may cause a trip hazard.

(i) Where there is a risk of the inhalation of fumes and vapours or the generation of an explosive atmosphere (from highly flammable liquids and gases) local exhaust ventilation must be used. Thus, do your decantation in a fume cupboard, *e.g.* when filling up wash bottles. Exhausts from vacuum lines, gloveboxes, *etc*. should be vented to a fume cupboard, laboratory extract system, or to the outside atmosphere and not into the open laboratory.

(j) At the end of an experiment there will remain the required product, waste solvent and other residues. **Waste must be disposed of safely (see Section I of the safety policy for more detailed instructions)**.

(k) Work involving naked flames is strictly controlled and must be adequately risk assessed. Work that requires manual control to be conducted safely should never be left unattended. Flames and compressed gas supplies should be shut off when not in use and on leaving the laboratory.

(l) Flammable substances must be kept well away from sources of ignition, including naked flames, electric hot plates and non-flameproofed electrical equipment.

(m) Ensure that all sinks remain free from clutter and blockages. All pipework *e.g.* reflux condenser tubing, should be securely connected to prevent leakage and floods. Where possible, water-free condensers or recirculating cold baths should be used.

(n) Foods, drinks, cosmetics and cigarettes **must not be taken into, or used in** areas where chemical substances are used or kept. These materials can readily become contaminated if kept and used alongside chemical substances. It is possible to transfer dangerous substances to the mouth or other sensitive areas of the body.

7. Metal Sharps

All personnel involved in the use, collection and disposal of “sharps” (used needles and scalpel blades *etc*) should be trained in the correct technique for the safe use, removal and disposal of these items.

(a) Sharp items must only be disposed of in an approved yellow sharps container, using the procedure described below.

If the needle/syringe/blade has been used for the transfer of chemical samples, it should be washed and decontaminated using an appropriate solvent. If an infective material was used, the syringe should be washed

three times with an aqueous solution containing 10% (v/v) Trigene, followed by three washes in water.

Needle/blade covers should ***NEVER*** be replaced, as this increases the likelihood of a needle-stick injury.

Likewise syringes and exposed needles or blades must ***NEVER*** be left on a working surface. They should be disposed of immediately after use.

(b) **Procedure for safely removing syringe needles**:

- ***NEVER*** remove a syringe needle by hand;
- hold the syringe with needle facing away from you;
- insert into the clasp on the opening of the sharps container;
- slide towards the narrow end until needle is held firmly;
- pull up to release the needle directly into the container.

A Needle may be disposed of whilst attached to a disposable syringe if this is the safest mode of disposal, provided that the container is sufficiently tall. Sharps containers should be disposed when two thirds full as per the University Health and Safety manual.

Further information can be found at (**UHSS Topic A-Z/Sharps**).

(c) **Incidents involving sharps**

The emergency procedures for injuries involving sharps are described in **Section B, Part 8** of the Safety Policy.

(d) **Work with blood and body products**

All researchers who are planning work with blood and body products should determine beforehand whether any vaccinations are required. Work must not commence until any required vaccinations have been done.

All researchers working with blood and body products should be aware of the procedures for safe use of sharps and the actions to be taken in the event of an incident (**Section B, Part 8** of the Safety Policy).

8. Gas Regulators and Manifolds

Most laboratory gases are piped into laboratories using low pressure pipelines and regulators from cylinders located in external cages. Less common gases may require the use of cylinders within laboratories. All cylinders must be secured to prevent falling by using chains or bench clamps. When using a gas cylinder with a regulator, **it is essential that**:

(a) the correct regulator for the gas is used;
(b) the inlet pressure of the regulator is correct for the cylinder;
(c) the regulator is in date;
(d) the maximum outlet pressure of the regulator is compatible with the reaction/process vessel to which it will be attached.

All regulators are replaced after 5 years of service. The replacement date is indicated by a yellow 'tag' attached to the regulator. Regulators and hoses

require a visual inspection for damage and to ensure that the threads and contacting surfaces are clean before attaching to cylinders. **Do not use damaged or out-of-date regulators or hoses**. Report any defects to the Safety and Research Technician who will arrange for a replacement unit. When fitting a new regulator, the use of PTFE tape as a thread lubricant is **not recommended**. In addition, normal PTFE tape must **never** be used with oxygen cylinders (oxygen-safe PTFE conforming to EN 751-3 must be used instead). When performing leak tests, the leak detect solution must be compatible with the materials used in the equipment construction, including the gas itself. Solutions containing hydrocarbons (including soapy water) must **never** be used for leak tests with oxygen.

Cylinders of flammable gases should not be kept in laboratories for any longer than necessary and must only be used as a temporary measure.

9. Use of Lasers and UV Equipment Outside Dedicated Laser Laboratories

(a) All handheld UV lamps used for the visualisation of thin layer chromatography (TLC) plates should be used in conjunction with a cabinet fitted with a suitable UV-filter.

(b) UV transilluminators, for the visualisation of fluorescent markers in gel electrophoresis, should be guarded (enclosed in an absorbent polymer) with an interlock that will make the device safe if the guard is opened. Instrument failsafe mechanisms should be inspected regularly. Those using transilluminators should be trained in the risks involved and procedures for their safe operation. Time-weighted exposure limits given in the manufacturers' specification must be respected. Eye and skin exposure should be avoided by seeking alternative working practices.

10. Shipment or Transfer of Chemicals

Before chemicals or other materials are supplied to a recipient outside the University:

(a) a risk assessment must be provided by the recipient that describes what the materials will be used for, who will use them and what control measures are in place (*e.g.* for transport and disposal);
(b) the risk assessment must be checked and approved by a competent person employed by the University and the approval indicated (*e.g.* by a dated signature or stamp);
(c) a valid safety data sheet must be provided with the shipment.

If a LabSafe order accompanies the shipment, a copy of the paperwork described above should be attached to the order. The order will not be approved without an authorised risk assessment. Copies of the paperwork should be stored on DUO ('Risk Assessments' tab, 'Material Transfers' folder).

For transfers within the University, no approval is required but the LabSafe database must be updated after the transfer has been made.

Dr John Sanderson
Departmental Safety Coordinator
6 September 2019 (Review date: 6 September 2020)