UNIVERSITY POLICY STATEMENT S6/14

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH (COSHH) REGULATIONS

Summary of changes

The changes to the COSHH policy primarily reflect changes to the way in which chemicals are now being classified and labelled under the Globally Harmonised System (GHS), which is being phased in over a number of years. The EU Regulation which implements these changes is already fully in force for the labelling of individual chemicals, but the next phase of implementation will commence in 2015 for chemical mixtures, with a two year transition period to take account of stocks already in the supply chain. These arrangements are highlighted in section 3 of the revised policy, section 1 of Appendix 1, and in a new Appendix 5.

Appendix 5 also sets out the requirement for departments to replace any old style hazard warning labels with GHS compliant ones, to review their COSHH assessments, local documentation and protocols to ensure that additional controls are not required under the new classification system, along with the time line for ensuring that these actions are complete.

A new section 4 refers to flammable substances or pyrophoric materials whose physicochemical properties are covered by other legislation (Dangerous Substances Explosive Atmospheres Regulations, DSEAR), but where the control measures are normally similar to those under COSHH and which, for convenience, are generally covered adequately by the University’s COSHH assessment form.

Section 10(c) covers the requirement for the retention of health records where individuals are using certain substances such as carcinogens, mutagens and nanoparticles, and the new arrangements for using the Human Resources Information System (HRIS) to record this information.
1. **Introduction**

The COSHH Regulations provide the legal framework for controls on exposure to hazardous substances arising from work activities. The updated publication (2013) of the 6th edition of the Approved Code of Practice on the Regulations has introduced a number of changes, which are reflected in this Policy Statement.

2. **Exposure to hazardous substances**

The definition under COSHH of hazardous substances ("substances hazardous to health") is very wide ranging and includes:

(a) substances used directly in work activities (e.g. laboratory chemicals, pesticides, cleaning products, adhesives);

(b) substances generated by work activities (e.g. solder or welding fumes, dusts from woodworking machinery);

(c) naturally occurring substances that are present in the workplace (e.g. allergens associated with laboratory animals, pollen in glasshouses);

(d) biological agents that are associated with work (e.g. bacteria or other microorganisms).

Lack of adequate control of exposure to such substances can (and does) result in injury or illness, ranging from skin or eye irritation to chronic, disabling, lung disease.

3. **Definition of hazardous substances**

The COSHH Regulations define the following as hazardous substances:

(a) Chemicals or mixtures of chemicals listed in Annex VI of the Classification, Labelling and Packaging of Substances and Mixtures Regulations (the CLP Regulation)\(^1\), and for which an indication of danger is specified as very toxic, toxic, harmful, corrosive or irritant.

(b) Substances that have been assigned a Workplace Exposure Limit (WEL)\(^2\). These are listed in the HSE publication EH40, which is published annually.

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\(^1\) European Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures came into force on 20 January 2009 in all EU Member States. The full provisions of CLP are being phased in over a lengthy transitional period but will be fully in force by 1 June 2015. The CLP Regulation adopts the United Nations’ Globally Harmonised System (GHS) for the classification and labelling of chemicals. Further information on CLP and GHS may be seen in Appendix 5.

\(^2\) The COSHH (Amendment) Regulations 2004 introduced the concept of the WEL and discontinued the use of maximum exposure limits (MEL) and occupational exposure standards (OES), which were familiar from earlier versions of COSHH.
(c) Any kind of dust, if its average concentration in air exceeds the levels specified in COSHH (i.e. >10mgm\(^{-3}\) of inhalable dust or 4mgm\(^{-3}\) of respirable dust, as time-weighted average exposures over an 8 hour period).

(d) Biological agents that are directly connected with work (e.g. those used in laboratories) or a work activity or process (e.g. Legionella bacteria from water cooling towers).

(e) Any other substance that is hazardous to health, but which does not fall into the above categories. This category includes:

- carcinogens and mutagens;
- asphyxiant gases;
- some pesticides;
- products or by-products of chemical reactions;
- carbon nanotubes and other nanomaterials.

4. **Substances presenting fire and explosion risks**

These substances are hazardous to safety on the basis of their physicochemical properties, and are subject to other legislation (Dangerous Substances and Explosive Atmospheres Regulations, DSEAR, 2002). These will include substances which are:

- explosive;
- oxidising;
- flammable (flash point below 55\(^\circ\)C);
- highly flammable (flash point below 21\(^\circ\)C);
- extremely flammable (flash point below 0\(^\circ\)C and boiling point equal to or less than 35\(^\circ\)C).

However, many substances that are hazardous to safety are also hazardous to health. The principles of control to be applied under COSHH (discussed in section 6(c)) will generally also satisfy DSEAR for laboratory scale use, and for convenience the COSHH assessment form may be used for both, but in addition DSEAR requires employers to:

- determine what dangerous substances are used in the workplace and specifically assess the fire and explosion risks;
- devise control measures to eliminate or control risks and mitigate effects of any incident;
- develop emergency procedures;
- classify any work areas where explosive atmospheres may occur and avoid ignition sources in such areas.

Further information on the classification of work zones is provided in University Policy Statement S1/05, “Storage of Flammable Liquids”, along with limits on the quantities of flammable substances that may be held in workrooms.
As with COSHH the provision of information, instruction and training (section 11) is a key tenet of DSEAR.

5. **What do the COSHH Regulations require?**

(a) The Regulations set out a number of duties on employers. Heads of departments must comply with these duties in respect of work activities that are under their control. The following paragraphs indicate the actions required and more detailed guidance can be found in sections 6-11.

(i) Assess the risks to workers (and others likely to be affected by the work) from hazardous substances present or generated in the workplace (section 6).

(ii) Prevent, or adequately control, the exposure to hazardous substances of workers and others likely to be affected by the work (section 7).

(iii) Ensure that any control measures identified, including engineering controls and personal protective equipment (PPE) are properly used and maintained. Ensure that defined working practices or standard operating procedures (SOPs), where identified as a control measure, are appropriate, workable and being followed (section 8).

(iv) Where necessary, arrange for monitoring of workplace exposures to hazardous substances (section 9).

(v) Where necessary, arrange for health surveillance for workers (section 10).

(vi) Ensure that workers are provided with information, instruction and training, so that they understand the possible effects of exposure to hazardous substances and how to use the control measures provided (section 11).

The Regulations also set out a number of duties on employees.

University staff must:

(vii) follow defined working practices or SOPs, where these are intended to minimise the risk of exposure to hazardous substances

(viii) use all control measures (including PPE) properly and report any defects to their supervisor or line manager

(ix) attend health surveillance appointments at the appointed time.
6. **Risk assessment**

The purpose of the COSHH assessment is to identify how to prevent, or adequately control, workers’ exposure to hazardous substances. The University’s COSHH assessment pro-forma and the accompanying notes on completion (Appendix 1) are designed to help the assessment process. Other assessment formats are also acceptable (e.g. incorporating assessments into laboratory SOPs) provided that they adequately address the points set out below.

It is usually preferable to adopt an activity-based approach to COSHH assessments, rather than making individual assessments for all the substances to which workers may be exposed. The assessment should be made by someone who is familiar with the activity, who has access to the relevant information and who has the knowledge and experience to make good judgements about the risks involved and the actions needed to minimise them. In many cases, further advice will be needed and this can be obtained from the departmental safety officer, area or divisional safety officer, or the University Safety Office.

The COSHH assessment must be carried out before work with hazardous substances takes place. It must consider the following points:

(a) Is it likely that a work activity could endanger someone’s health?

The assessment should:

   (i) consider the substances that are present, used or produced;

   (ii) identify the properties of the substances (e.g. are they volatile, or dusty?);

   (iii) identify the hazards associated with those substances (e.g. are they toxic, harmful, irritant?);

   (iv) identify possible exposure routes (e.g. by inhalation, skin absorption, ingestion from contaminated hands);

   (v) identify all those at risk of exposure (e.g. workers, cleaners, maintenance staff, other visitors);

   (vi) pay special attention to those who may be unusually vulnerable, either by virtue of their physical condition (e.g. pregnant or nursing mothers; or people with certain medical conditions), or because their relative inexperience requires a high degree of supervision (e.g. work experience or undergraduate students).

The information provided on material safety data sheets (MSDS) will help in assessing points (i) to (iii). However, MSDS do not, in themselves, constitute a COSHH assessment, as they take no account of the circumstances in which the substances are used.
(b) **Have significant risks of exposure been identified?**

If so, then control measures will need to be specified. In general, engineering controls such as laboratory fume cupboards, or local exhaust ventilation (LEV) for woodworking machinery and for welding or other fumes are already available, although the assessment may identify the need for more. Personal protective equipment (for respiratory, skin or eye protection) may also be needed, as may specific working procedures. Control measures are considered in more detail in section 7.

(c) **Should the assessment be recorded?**

In general, it should, although the information recorded should be proportionate to the risk identified. For work using substances commonly found in offices (e.g. correcting fluids, adhesives, photocopier toners), it is sufficient to make a generic assessment. This can be done by listing the substances, noting that they must be used in accordance with the supplier’s or manufacturer’s instructions, and concluding that their use in this way presents little or no risk to health. A more comprehensive record will be needed occasionally where work presents a greater risk to health and the COSHH assessment form should be used.

(d) **Does the assessment have to be reviewed?**

The assessment is intended to be a working document and it must be reviewed if there is evidence that it is no longer valid (e.g. following a change in the substance or the form of a substance used in a procedure, or a major change in work practices; following defects or a breakdown in control measures, where results of health surveillance have identified work-related ill health; where there is new information on the health effects of exposure to a substance).

It is good practice to carry out regular reviews of COSHH assessments. As an absolute minimum, assessments must be reviewed every five years, but higher risk procedures should be kept under close scrutiny and reviewed more frequently.

Appendix 3 shows how assessment should be approached for common University activities.

7. **Control of exposure and control measures**

The Regulations set out a hierarchy of control, which must be followed.

(a) Prevent exposure to hazardous substances where reasonably practicable, e.g.

   (i) change the procedure so that hazardous substances are not required, or not produced (e.g. use colophony-free solder to avoid the generation of colophony fumes, which may cause asthma, from traditional resin-cored solder);
(ii) use a safer alternative substance (e.g. use Decon instead of chromic acid for cleaning glassware, where possible);

(iii) use a safer form of the substance (e.g. use premixed acrylamide solutions instead of acrylamide powders, to avoid exposure to acrylamide dust).

(b) If exposure cannot be prevented, it must be adequately controlled.

(i) The eight principles of good practice set out in Appendix 2 must be applied.

(ii) If there is a WEL for the substance used, then it must not be exceeded.

(iii) If the substance causes cancer, heritable genetic damage or asthma, then exposure must be reduced to as low a level as reasonably practicable.

(c) The principles of good practice define an order of priority for the choice of control measures where exposure cannot be prevented by the methods described in (a) above.

(i) Totally enclose the process (e.g. by using a glove box or Class 3 microbiological safety cabinet).

(ii) Change the system of work so as to minimise the number of people exposed, to limit their exposure time (e.g. by controlling access to areas of particular hazard), and to minimise the amount of hazardous substance used or produced.

(iii) Use partial enclosure with LEV (e.g. a fume cupboard or Class 1 or 2 microbiological safety cabinet); use LEV (e.g. dust extraction equipment on woodworking machinery, or tip extraction on soldering irons); ensure there is good general ventilation.

(iv) Provide safe handling, storage, transport and disposal of hazardous substances (e.g. use only the minimum quantity and use double containers where danger would arise from spillage in storage or transport).

(v) Provide adequate hygiene measures (e.g. provide facilities for laundering lab coats and other protective clothing; enforce the prohibition on eating or drinking in laboratories).

(vi) Use personal protective equipment (PPE) only where adequate control cannot be achieved by other measures, and then use it only in addition to those measures (e.g. you must not provide dust respirators as an alternative to providing LEV).

(vii) Note that where tight-fitting respiratory protective equipment (RPE) is provided as a control measure, then face fit testing will be required (see Appendix 4, which contains more information on PPE).
8. **Use and maintenance of control measures**

If they are to be effective, control measures must be properly used and departments must have adequate supervision arrangements in place to ensure compliance. Workers also have a duty to use control measures properly and to report any defects (in equipment, PPE or working practices) to their supervisor.

Control measures also need to be maintained to ensure they are still effective.

(a) Users should check before use that there is an inward airflow to their LEV (e.g. by using a tissue or ribbon tell-tale), or that any displays or indicators provided on the equipment are confirming proper operation.

(b) LEV must be maintained according to the manufacturer’s instructions.

(c) LEV must be thoroughly examined and tested at least annually by a competent person. The examination and test should ensure that the equipment can meet its intended operating performance for controlling hazardous substances.
   
   (i) In the case of ducted fume cupboards, this service is provided through the University Estates Service.

   (ii) In the case of microbiological safety cabinets, regular tests are the responsibility of the department, which must be carried out according to the University’s Biological Safety Policy using a competent contractor.

   (iii) In the case of other LEV, a thorough examination and test is provided through the University’s Insurance Section. Departments are responsible for ensuring that the Insurance Section has up to date information about the inventory of equipment that needs testing.

(d) Where RPE (other than disposable RPE) is provided, then this must also be maintained, examined, and tested according to the manufacturer’s recommendations.

9. **Monitoring of exposure**

Where suitable techniques exist, monitoring of airborne containments may occasionally be required, for example:

(a) where failure of control measures may result in a serious health effect;

(b) where it is necessary to check that a WEL has not been exceeded;

(c) where it is necessary to check the effectiveness of control measures (e.g. where a case of work-related disease has been diagnosed).

The Safety Office can advise when monitoring is required and will make the appropriate arrangements.
10. Health surveillance

Health surveillance is intended to protect individual employees by the early detection of work-related adverse health changes; to help evaluate the efficiency of control measures; and to evaluate hazards to health by collecting and analysing data.

(a) When is health surveillance required?

Health surveillance will be required in the following circumstances:

(i) where workers are exposed to a hazardous substance that is linked to an identifiable disease or adverse health effect; and

(ii) where there is a reasonable likelihood that the disease or health effect may occur under the particular conditions of their work; and

(iii) where there are valid techniques for detecting the disease or health effect.

(b) Occupational Health Service (OHS) registration

Where the criteria in (a) are met, departments must register workers with the OHS. Work with the following classes of hazardous substances may require registration, depending on the circumstances of exposure:

(i) substances of recognised systemic toxicity (i.e. those that can be inhaled, ingested, or absorbed through skin or mucus membranes and affect parts of the body other than those where they entered), e.g. metals like mercury, thallium, lead and their salts;

(ii) substances known to cause occupational asthma, e.g. laboratory animal excreta and secreta, colophony (rosin-based solder flux fume), some wood dusts, glutaraldehyde, some plant pollens;

(iii) substances known to cause dermatitis or severe irritation of the mucous membranes, e.g. nickel, cobalt, arsenic and chromium compounds; some adhesives or their components;

(iv) some pathogens or genetically modified organisms.

Where workers are registered with the OHS, departments will need to provide the OHS with adequate information so an appropriate health surveillance programme may be devised.

This will include the properties of the substance, the potential exposure routes, the intensity, frequency, and duration of exposure, and any other information that may be considered relevant. The OHS or the University Safety Office will advise in cases where there is any doubt about the necessity for health surveillance.
Departments should ensure that individuals are re-registered with the OHS whenever there has been a change in exposure and that the OHS is notified when exposure ceases. Where no such changes have occurred, then individuals should be re-registered every two years.

(c) Health records

The format of the record of health surveillance (the health record) is prescribed by COSHH. It does not include clinically confidential information (i.e. it is not a medical record). Where health surveillance is required, the OHS keeps these records on behalf of the University and they will be retained for at least 40 years.

The OHS will inform individuals of the results of their health surveillance. They will also inform departments of the collective results of health surveillance, so as to provide assurances about their workers’ continuing fitness to work.

There will be circumstances where health surveillance is not appropriate, but where records of exposure to substances hazardous to health are required, for instance in the case of known or suspected carcinogens, man-made fibres, and carbon nanotubes or other biopersistent high-aspect ratio nanomaterials (HARNs). These records will not be prepared or kept by the OHS, but should be generated by the department, which will need to enter the relevant information on the section of the University’s Human Resources Information System (HRIS) set aside for health records. HRIS will retain this information for at least 40 years.

(d) Health surveillance appointments

In order to provide more meaningful information to departments to use in reviewing their control measures, the OHS will attempt to assess groups of workers from the same working environment at the same time and, wherever possible, at a location close to their workplace.

If this is not possible, then appointments will be offered at an OHS centre. Attendance for health surveillance is compulsory and departments are responsible for ensuring that their staff attend. Failure to attend will result in steps being taken to ensure that the worker is removed from the work that requires health surveillance.
(e) **Instances of suspected ill health**

If an individual (either between planned health surveillance appointments, or not undergoing health surveillance at all) shows symptoms that may be associated with exposure to a hazardous substance then they should report this to their supervisor and the department should refer them to the OHS. Alternatively, they may wish to self-refer to the OHS. Where an individual is given a medical certificate linking sickness absence to possible work-related illness, then the department should refer them to the OHS and provide a copy of the certificate.

Whenever health surveillance indicates that ill health may be associated with exposure to hazardous substances, then the department, together with the Safety Office and the OHS, must review the control measures. Every effort will be made to allow individuals to continue with their work, using appropriate control measures. Where this is not practicable, then the individual will need to be removed from further exposure and further risk to their health.

11. **Information, instruction and training**

Departments must provide those working with hazardous substances with the information contained in the COSHH assessments and SOPs relating to their work. Where appropriate, they must also be provided with information about the health surveillance process (including the purpose of health surveillance, their duty to attend for health surveillance on the appointed date and the arrangements for access to their health records).

Departments must also provide instruction and training so that workers know:

(a) when and how to use the control measures provided;

(b) how to use PPE, and especially RPE, correctly (e.g. how to fit and remove gloves and how long to use disposable gloves and masks before they must be replaced);

(c) how to clean and store reusable PPE, including RPE;

(d) how to act in an emergency involving hazardous substances (e.g. how to deal with a spill, or any specific first aid measures to be taken if there is a personal exposure).

12. **Prohibitions on certain substances**

The Regulations impose prohibitions on certain substances. The relevant prohibitions for the University are:

(a) the use or production for any purpose of 2-naphthylamine; benzidine; 4-aminodiphenyl; 4-nitrodiphenyl, their salts; and any substance containing any of these compounds, in a total concentration ≥0.1% by mass;
(b) the use of sand or other substance containing free silica as an abrasive for blasting articles in any blasting apparatus.

GLOSSARY

CLP Classification, Labelling and Packaging of Substances and Mixtures Regulations
COSHH Control of Substances Hazardous to Health Regulations
DSEAR Dangerous Substances and Explosive Atmospheres Regulations
GHS Globally Harmonised System
HARN High Aspect Ratio Nanomaterial
HRIS Human Resources Information System
HSE Health and Safety Executive
LEV Local Exhaust Ventilation Equipment
MSDS Material Safety Data Sheets
OHS Occupational Health Service
PPE Personal Protective Equipment
RPE Respiratory Protective Equipment
SOP Standard Operating Procedure
WEL Workplace Exposure Limit

THIS STATEMENT FORMS PART OF THE UNIVERSITY’S SAFETY POLICY AND UNIVERSITY POLICY NOTE S6/05 IS SUPERSEDED. PLEASE AMEND THE INDEX.

August 2014 J Black

CIRC: A, C, H, O, S: Heads, DSO1s, DSO2s, Admins, DDSO1s, DDSO2s, List V.
CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS
– NOTES ON COMPLETION OF ASSESSMENT FORMS

General advice – A COSHH assessment must be made before the start of any work involving a hazardous substance. The assessment will often need to be in writing and use of the form will facilitate this. Complete all sections if applicable; you should cross through those that do not apply, to indicate clearly that the section has been properly considered and not simply omitted.

Note that COSHH assessments are not only required for laboratory operations. Maintenance tasks, in particular, often use large quantities of hazardous substances and will require written assessments.

Generally, however, the assessment should cover the whole process or procedure and separate assessment forms need not be completed for each individual substance used.

A written assessment will always be required in the following cases:

1. where substances may cause serious damage to the eyes or serious damage to health by prolonged exposure, sensitisation via the inhalation or dermal routes, heritable genetic damage, which may cause cancer or are cancer-causing by inhalation, which may impair fertility or cause harm to the unborn child or breast fed babies;

2. where extreme toxicity is indicated (e.g. LD$_{50}$ oral, rat, <1 mg kg$^{-1}$);

3. where special first aid provision is required (e.g. for cyanide, hydrofluoric acid, phenol);

4. where substances with a Workplace Exposure Limit (WEL) are used and are likely to give rise to significant exposure (e.g. where volatile or dusty chemicals are used on the open bench with no fume cupboard or other local exhaust ventilation; where adhesives and other volatile preparations, or corrosive materials, are used in maintenance operations);

5. where procedures involve the risk of asphyxiation (e.g. by nitrogen or helium);

6. where procedures involve explosive or pyrophoric substances (although these are not strictly subject to the COSHH Regulations, the form provides a convenient format for making the risk assessment required under other relevant legislation, i.e. DSEAR);

7. work with biological agents, which must be assessed according to the University’s Biological Safety Policy.

This is not an exhaustive list and other written assessments may be required. Take advice from your departmental safety officer if in doubt.
The information on the form must be communicated in a suitable way to all personnel involved in or affected by the work (the top copy can be used as part of this process and the duplicate kept as the departmental record). Completed assessment forms should (wherever possible) be kept in the area where the work takes place and their location should be known to all those involved. Storage in electronic form is acceptable.

**Department and location of work** – include the location of the work (e.g. a room number) and indicate whether a laboratory, workshop, plant room or some other workplace is involved.

**Persons involved** – give their names where possible and indicate who they are (e.g. academic or technical staff, undergraduate or post graduate student, maintenance staff).

**Description of procedure or process** – describe briefly what is involved.

**Substances used** – list the hazardous substances used, avoiding the use of abbreviations or trade names wherever possible and identifying the chemical content, if known.

**Quantities used and frequency of use** – this information is vital if the potential exposures and hence the potential risks are to be accurately assessed under the conditions which you are using hazardous substances. For instance, some laboratory work involving microgram quantities of highly toxic substance may present little or no risk to the user, if appropriate procedures are used. On the other hand, some maintenance tasks using substances that are simply irritant or harmful present a high risk because of the very large quantities that are used.

Where larger quantities of substances are used in laboratories, for example decanting from larger volumes of concentrated stock to make working solutions, it may be appropriate to consider the COSHH assessment in two parts (or on two separate forms), since additional control measures and emergency procedures may be required in the former case.

**Hazards identified** – identify both the hazardous properties and the potential exposure route. For example, is the substance known to be toxic or harmful? Is it a volatile liquid or a dusty solid? Is it hazardous by inhalation or skin contact?

Information on the hazardous properties of many substances is freely available from manufacturers and suppliers, often online. Try the following sources:

1. Labels on containers, which may carry orange and black hazard warning symbols and Risk and Safety (R&S) Phrases. (These will be phased out over the next few years and replaced by Hazard and Precautionary Statements).

2. Labels which may carry the new warning pictograms and Hazard and Precautionary Statements. There are 9 pictograms, all with a white background, a red diamond frame and a black hazard symbol. These have been adopted as part of the Globally Harmonised System (GHS) of hazard classification (see also appendix 5) and which will fully replace R&S phrases by 1 June 2017.

Further information on these new pictograms can be viewed at:

Annexe 1 - Globally Harmonised System

3. Manufacturers’ and suppliers’ safety data sheets (MSDS)

4. Standard safety texts, e.g. Hazards in the Chemical Laboratory (Royal Society of Chemistry), Dangerous Properties of Industrial Materials (SAX), Handbook of Reactive Chemical Hazards (Bretherick), the Health and Safety Executive publication EH40 for Workplace Exposure Limits (WELs).

Note that most safety information relates to single substances. You will need to make your own judgements, based on experience and extrapolation of known hazards, if the risks from reactions or mixtures are to be correctly assessed.

**Could a less hazardous substance, or form of the substance, be used instead?** – if the answer is yes, then you must justify why you are not using it. COSHH requires you to substitute less hazardous materials wherever possible, but there may be good reasons for not using them. You should state those reasons here.

**What measures have you taken to control the risk?** – you have identified the hazards present in the operation and made some estimate of potential exposure to those hazards, and the route of entry. Your control measures should now be chosen to prevent or minimise those exposures and thus to prevent or minimise any resulting harm, i.e. to ensure that the risks are adequately controlled. You must consider those who may be particularly at risk (e.g. pregnant or nursing mothers, those who are vulnerable because of certain medical conditions, or inexperienced workers). Consider also how your work may affect people who are not directly involved (e.g. cleaners, contractors, security staff, service engineers, visitors, or members of the public) and ensure that your control measures will protect them too.

**Engineering control measures** – specify what equipment you will use (e.g. a fume cupboard, dust extraction unit or other LEV, glove box, total enclosure).

**Personal protective equipment (PPE)** – specify the sort of PPE required.

If dust masks are specified, then identify the standard required (e.g. EN149: 2001 FFP2, or protection factor 10). Note that a fit test is required for individuals who must wear tight-fitting RPE.

If gloves are needed you must also identify the correct type for the substance in use (e.g. nitrile, butyl rubber, vinyl; disposable or reusable). Manufacturers and suppliers can provide information on chemical compatibility and chemical resistance.

If eye protection is needed, decide whether safety spectacles, goggles or face shields are appropriate.

You may need to specify protective clothing, e.g. lab coats, coveralls or aprons. Further advice can be obtained from the University Safety Office.

**Management measures** – consider whether you need other controls on the work, e.g. restricting the quantity of substance that may be used, restricting access to a process, prohibiting lone working, or specifying the level of supervision required (especially where inexperienced workers are involved).

**Checks on control measures** – you must ensure that your control measures, including written protocols, are effective and continue to work properly.
Simple visual inspections of engineering control measures (e.g. fume cupboards or LEV) should be carried out before use to ensure an inward flow of air away from the operator’s breathing zone (e.g. pressure gauges, airflow indicators, or ‘tell-tales’). Work areas should also be checked for obvious signs of control failure (e.g. dust deposits, odours).

Fume cupboard performance is checked annually by the University Estates Services, and some other types of LEV (e.g. wood dust extraction systems), are checked by a competent contractor engaged centrally. Microbiological safety cabinets are the responsibility of the department, and further information on these may be found in the University’s Biological Safety Policy.

Environmental monitoring will rarely be required. Take advice from the University Safety Office if you think it might be needed.

Is health surveillance required? – the Occupational Health Service (OHS) will carry out health surveillance where a department has identified that it is necessary in a COSHH assessment.

Health surveillance will be required if there is likely to be significant exposure to substances where there is evidence of sensitisation or of having a carcinogenic effect via inhalation or the skin, or which are known to cause cancer; to substances likely to cause occupational asthma, e.g. laboratory animal allergens, certain wood dusts, colophony (rosin-based solder flux fume); and to substances of recognised systemic toxicity, e.g. heavy metals and their salts.

Consult the OHS or the University Safety Office if you are unsure whether health surveillance is required.

Special training requirements – decide whether any special training is required to carry out the procedure safely. In most cases, on the job training will be sufficient. The importance of good technique should not be underestimated as a means to help prevent certain exposures e.g. splashes to the eyes, and inexperienced personnel should be supervised closely during their training period. A training record should be kept.

Emergency procedures – in case of accidental exposure or spillage, general principles apply for most substances (e.g. remove people from the contaminated area; wash splashes on skin or in eyes with copious amounts of water; use proprietary spill kits according to their instructions). Complete this section if there is a hazard that requires special procedures in an emergency (either a spillage, an injury or a fire). For example, for work with hydrofluoric acid then calcium gluconate gel should always be available; for phenol, then polyethylene glycol (PEG) 300 should be available for use in first aid treatment. Where these substances are used personnel in the immediate area should be conversant with any specific first aid measures that apply, as well as those first aiders who may attend an incident.

Waste disposal procedures – consider how any waste will be disposed of before you start the work: waste disposal is expensive and the disposal of some wastes may be extremely difficult. University Policy Statement S7/14 deals with waste disposal and if further advice is needed then consult the University Safety Office.
**Name and signatures** – the name and signature of the person making the assessment is required. In the case of a student (undergraduate or postgraduate) the supervisor must sign. Since the head of department is responsible for safety in his/her own department, his/her signature or that of his/her nominee (as identified in the departmental statement of safety policy) must be added.

**Additional information** – occasionally there might not be room on the form to give all the information needed. In this case, use a separate piece of paper for the additional details and attach it to the assessment form.

Your department may wish to add reference numbers to the forms and a space is provided in the top right-hand corner for this purpose.
### HSE’S PRINCIPLES OF GOOD PRACTICE FOR THE CONTROL OF EXPOSURE TO SUBSTANCE HAZARDOUS TO HEALTH

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<tr>
<th>(a)</th>
<th>Design and operate processes and activities to minimise emission, release and spread of substances hazardous to health.</th>
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<tbody>
<tr>
<td>(b)</td>
<td>Take into account all relevant routes of exposure – inhalation, skin absorption and ingestion – when developing control measures.</td>
</tr>
<tr>
<td>(c)</td>
<td>Control exposure by measures that are proportionate to the health risk.</td>
</tr>
<tr>
<td>(d)</td>
<td>Choose the most effective and reliable control options, which minimise the escape and spread of substances hazardous to health.</td>
</tr>
<tr>
<td>(e)</td>
<td>Where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable personal protective equipment.</td>
</tr>
<tr>
<td>(f)</td>
<td>Check and review regularly all elements of control measures for their continuing effectiveness.</td>
</tr>
<tr>
<td>(g)</td>
<td>Inform and train all employees on the hazards and risks from the substances with which they work and the use of control measures developed to minimise the risks.</td>
</tr>
<tr>
<td>(h)</td>
<td>Ensure that the introduction of control measures does not increase the overall risk to health and safety.</td>
</tr>
</tbody>
</table>
Appendix 3

EXAMPLES OF GOOD PRACTICE

Many work procedures and suitable controls are already in place in the University, e.g. work with biological agents is covered by University Biological Safety Policy. Work in the University may be divided into five general groups:

1. **Standard laboratory methods, e.g. work carried out by undergraduates and postgraduates students on taught courses**

   Current practice uses a limited range of substances and well-tried techniques. If appropriate safety precautions are detailed in the relevant laboratory practical protocols then no additional written COSHH assessment is required.

   Any additions or modifications to these standard protocols would require reassessment and departments should periodically review these protocols to ensure adequate control of exposure to hazardous substances.

2. **Workshop operation where engineering control measures should be provided**

   Good practice requires the use of well-designed and efficient LEV to remove dust and fumes at source or draw them away from the breathing zones of workers involved in welding, soldering, or woodworking operations.

   Departments should monitor and review their current controls, to ensure that they are adequate. Written evidence of monitoring and review should be kept.

3. **Other routine work**

   Many proprietary products commonly available to the general public are used in office and maintenance work. These include cleaning products, detergents, paints, glues, correcting fluids, inks and copier toners. For these substances, it is usually sufficient to make a generic assessment by listing the substances, noting that they must be used in accordance with the supplier’s or manufacturer’s instructions, and concluding that their use in this way presents little or no risk to health. A more comprehensive record will be needed occasionally where work presents a greater risk to health (e.g. because large quantities are used) and the COSHH assessment form should be used.

4. **Staff and students using non-standard methods**

   This group includes students and other workers who are carrying out research and other non-routine work.

   Although most of this work will be carried out in laboratories suitably equipped with fume cupboards or safety cabinets, it is not sufficient to claim that exposure is controlled by good laboratory practice. A written COSHH assessment will normally be required and the notes on completion of the University’s COSHH assessment form (reproduced in Appendix 1) should be read to ensure that the relevant points are addressed adequately.
5. **External contractors**

Contractors (including those installing or maintaining equipment) must be given sufficient information to enable them to protect their employees from risks to their health. In turn, they must inform departments of any possible risks to University staff, students and others arising from their work. It may be necessary to provide contractors with, or ask them for, written COSHH assessments.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. Limitations of PPE

PPE must be considered only as a last line of protection, used in addition to other measures when adequate control cannot be achieved by other means. This means, for instance, that it is not appropriate to use a dust respirator instead of suitable LEV, or a chemical cartridge respirator instead of a fume cupboard.

PPE is not an effective or reliable control measure on its own because:

(a) the correct PPE has to be selected for the task and for the wearer;
(b) it has to fit properly and be compatible with any other PPE that is worn;
(c) it must be properly donned and worn;
(d) it may be uncomfortable to wear and interfere with the task;
(e) it must be properly stored and maintained if it is to stay in good condition;
(f) it can fail to danger (e.g. gloves can develop leaks, “breakthrough” of respirator cartridges can occur);
(g) it provides no protection for those nearby, if they are not also wearing PPE.

2. Respiratory protective equipment (RPE)

Inhalation exposure is the most important route for entry of many hazardous substances. Although there should always be other control measures, RPE may also be needed in some applications.

RPE can be divided into two types: tight-fitting (masks) and loose-fitting (ventilated helmets, visors or hoods). In the University, RPE is mainly used for protection against dusts and both types are in use.

(a) Tight-fitting respirators (masks) can only provide adequate protection if there is a good seal against the wearer’s face. The fit will be affected by a beard or stubble in the region of the seal and some masks cannot be worn with spectacles.

The most commonly-used tight fitting RPE is the disposable filtering face piece respirator (“dust mask”). This is used to protect against fine dusts, such as wood dust, MDF dust, or laboratory animal allergens. These respirators must conform to EN 149: 2001 and be CE marked. Three categories are available:

(i) low efficiency, FFPI (Protection Factor 4);
(ii) medium efficiency, FFP2 (Protection Factor 10);
(iii) high efficiency, FFP3 (Protection Factor 20).
Only FFP2 and FFP3 respirators are recommended as these give the highest levels of protection. **Surgical masks and nuisance dust masks are not classed as RPE and must not be used as a control measure.**

Where tight fitting respirators (including disposable respirators) are used as a control measure, then a face fit test must be carried out to confirm that the mask provides adequate protection. The fit test confirms that a particular size and type of respirator provides a proper fit, and therefore proper protection, for each individual undergoing the test. The individual must continue to use the size and type of mask for which they have been successfully fit tested. If they use more than one type of mask, then more than one fit test will be required. Departments are responsible for identifying who needs a fit test, ensuring that they attend for the test and for keeping the records of the fit test (they should be kept for the duration of the individual’s employment).

Fit testing must be carried out by a competent contractor (respirator suppliers are often able to arrange this service) or performed in-house by suitably-trained and competent staff. Departments should consult their Area or Divisional Safety Officer for further advice on respirator fit testing.

(b) Loose fitting respirators (ventilated helmets, visors, or hoods) use a fan-assisted flow of filtered air to provide protection. Because they do not rely on a tight fit, they are the only RPE that is appropriate for those with beards, or facial hair that would interfere with a mask’s face seal.

These respirators must conform to EN 12941 and be CE marked. Three categories are available:

(i) TH1 (Protection Factor 10);

(ii) TH2 (Protection Factor 20);

(iii) TH3 (Protection Factor 40).

Note that TH2 and TH3 respirators provide considerable protection against high exposures and no fit test is required.

3. **Skin protection**

Some substances are hazardous by skin contact, either directly (e.g. corrosive substances like concentrated acids) or because of systemic effects following absorption through the skin (e.g. organic mercury compounds). Some substances (e.g. phenol and hydrofluoric acid) can have both local and systemic effects. Safety data sheets, hazard warning labels and EH 40 (in which some substances are given Sk notations) can provide more information about these hazards.

Disposable gloves are commonly provided to protect against skin contact with hazardous substances. They must be carefully chosen to suit the activity and the substance in question. The manufacturer’s advice must be obtained and followed, especially on the suitability of the glove for particular chemicals and the permissible exposure time to the chemical before it “breaks through” the glove material.
While the use of powdered latex gloves is prohibited in the University the use of any non-powdered latex gloves must be the subject of a written COSHH assessment. Latex disposable gloves are commonly used and relatively cheap, but their use is no longer justified without a proper risk assessment because of the increasingly high incidence of latex allergy in the UK population. Latex glove use should be reserved for those tasks where great manual dexterity is required, or (rarely) where their chemical resistance is superior to that of alternatives such as nitrile. Latex gloves must not be used for general tasks (e.g. cleaning, food handling, or maintenance) where other gloves can be substituted.

4. **Eye protection**

   Eye protection is dealt with in detail in the Appendix to UPS S8/10.

   The COSHH assessment should identify appropriate eye protection (safety spectacles, goggles or face shield) for the task. While safety spectacles are commonly worn (and are compulsory in laboratories) they do not provide adequate protection where there is a high risk of chemical splash to the eyes or face.
THE GLOBALLY HARMONISED SYSTEM (GHS)

Background

The Globally Harmonized System (GHS) for the Classification and Labelling of Chemicals is a United Nations initiative to facilitate international trade in chemicals, to promote standard criteria for classifying them according to their health, physical and environmental hazards, and to better inform users through standardised material safety data sheets (MSDS).

The European Union (EU) has adopted GHS and will implement it in its member states as an EU Regulation, the Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulation.

CLP entered into force in January 2009 and many parts of the CLP Regulation applied from 1 December 2010. For example, the classification and labelling requirements of CLP now apply to all single substances placed on the market, and those in the supply chain (e.g. on the shelves or in warehouses) on that date were allowed a two-year period of transition.

CLP will also apply to chemical mixtures from June 2015, again with a further two years grace to deal with products already in the supply chain.

Most of the responsibility for classifying, packaging and labelling according to CLP is placed on chemical suppliers, but end-users must be aware of the changes in labelling, phrasing and material safety data sheets (MSDS).

Labelling

The CLP Regulation requires chemicals to be classified for their hazards and labelled accordingly. Under CLP the labels are very different to the old scheme in the EU.

The orange and black “hazard warning symbols”, familiar from the previous scheme, will be replaced by a white diamond edged in red with a black symbol or “pictogram” under CLP.

Although some of the pictograms will be familiar (e.g. ‘skull’, and ‘flame’), three new pictograms have been introduced:

- the ‘exclamation mark’, which indicates lower acute toxicity and irritation effects
- the ‘silhouette’, which indicates serious, chronic health effects
- the ‘gas cylinder’, which indicates gases under pressure.

There are a total of 9 pictograms under CLP and the three new ones are shown in the bottom row of the following examples.
Phrasing

The familiar phrasing to describe hazards, ‘indication of danger’ in the old scheme (e.g. ‘Highly Flammable’, ‘Harmful’, ‘Dangerous to the Environment’) will change to a single ‘signal word’ under CLP (e.g. ‘Danger’ for very severe hazards or ‘Warning’ for less severe ones), unless deemed of such low hazard to not require one.

Risk and Safety Phrases (R & S Phrases) are also being replaced by Hazard and Precautionary (H & P) Statements.

CLP comprises twenty-nine hazard classes and these are divided into three areas: physical, health and environmental hazards.

Each hazard statement has a corresponding code, which are separated as follows:

- H200s Physical hazards
- H300s Health hazards
- H400s Environmental hazards
CLP’s hazard classes are further sub-divided into categories which have different criteria for classification.

For physical hazards, CLP has introduced new hazard classes, such as ‘corrosive to metals’. In doing so, it brings the classification for supply in line with the requirements for the transport of dangerous goods.

For health hazards, a chemical previously classified as ‘harmful’ may be classified under CLP according to its acute toxicity, aspiration toxicity, specific target organ toxicity – single or repeated exposure, i.e. ‘STOT SE’, or ‘STOT RE’, respectively. In addition, the transition to CLP may cause an apparent increase in hazard for some properties due to the classification criteria for the different CLP categories. In the case of acute oral toxicity, for example, a chemical previously classified as harmful may instead be classified as toxic under CLP.

Further information on the CLP classification system may be found on various suppliers’ websites, including: http://www.sigmaaldrich.com/content/dam/sigma-aldrich/countries/european-images/GHS_EU_Poster.pdf

Material Safety Data Sheets (MSDS)

Under the transitional arrangements to adopt GHS material safety data sheets may provide health and safety phrasing information according to CLP as well the previous scheme. However, once the transitional period has lapsed only information relating to CLP will apply. This is currently the case with single chemicals.

However, as CLP will apply to mixtures from 1 June 2015, again with a further two years to deal with products in the supply chain, health and safety phrasing may be provided in both formats.

What do you need to do?

(a) It is the responsibility of chemical manufacturers and suppliers to ensure that the labelling and classification of single chemicals is now fully CLP compliant. However, users should check that all new purchases are labelled appropriately.

(b) Users should ensure that working stock bottles are labelled with the ‘new’ style labels (red diamond frame with the black hazard symbol), rather than ‘old’ style pictograms (orange and black diamond).

(c) You may still receive from suppliers chemical mixtures in containers labelled in the ‘old’ manner (until 1 June 2017). However, as this date approaches the number of chemicals labelled in the old format should reduce significantly. From this date all old hazard warning symbols will become invalid. Users should check that all new purchases are labelled appropriately.
(d) Some departments with a very small chemical inventory and a history of infrequent use should ensure that redundant chemical stock is safely disposed of (via the hazardous waste disposal route), and may then wish to replace any remaining chemical warning labels with CLP compliant ones. However, it is not expected that all current chemical stocks are relabelled, but certainly as existing stock is depleted and replaced users should ensure that all incoming chemicals are labelled in accordance with CLP.

(e) COSHH assessments must be reviewed and updated to reflect the new H&P statements if the current risk and safety phrases indicate a lower standard of stringency, e.g. where ‘toxic’ chemicals were previously classified as ‘harmful’, or where H&P statements cross over multiple hazard classes. This review should consider whether any additional control measures are required, such as the need for health surveillance, or where changes are required to the way the work is conducted.

(f) COSHH assessments for all new work should use the information provided in H&P statements as the basis on which control measures are decided.

(g) If the H&P statements require an equivalent or lower level of stringency, existing protocols and SoPs, will most likely still be valid but they must be updated when the next review date is due. Documents can be updated immediately if preferred.

(h) Users are reminded of the importance of turning over their chemical stock, and disposing of those that are no longer required.

Supervisors must ensure that these changes are brought to the attention of everyone involved in the work, and that progress is made to ensure that the requirements of CLP are phased in and fully implemented by the due date.