

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH (COSHH) CODE OF PRACTICE

1. INTRODUCTION

This Code of Practice describes the control measures appropriate for meeting legal requirements and promotes best practice for work involving the use of substances Hazardous to Health.

It aims to provide those responsible for the use of hazardous substances with information on the steps they need to take to ensure compliance with current legislation. These guidelines may, where appropriate, be incorporated into Faculty or Directorate policies and procedures.

COSHH is an acronym for 'Control of substances Hazardous to Health'. This is a regulatory framework that sits under the Health and Safety at Work Act 1974. It is designed to ensure that any substances that are hazardous to health are assessed suitably and sufficiently to protect people from the effects on their health because of the hazards that substance poses. COSHH is a process that is activity based not substance based. There is a common misunderstanding that COSHH is the risk assessment for a substance. This is not the case. How a substance is used, changes the risks that it poses. For example, using an acid in a test tube and pouring it into a beaker poses one set of risks, but spraying it in the air, poses a whole set of new risks. Using a dilute concentration of acid is different to using a concentrated solution. They all will need to be controlled in different ways.

The risk assessment and properties of a substance is contained in a Safety Data Sheet (SDS) or sometimes called a Material Safety Data Sheet (MSDS). The SDS or MSDS contains the information you will need in order to assess your activity which involves substances hazardous to health.

By law, suppliers of chemicals must provide an up-to-date Material Safety Data Sheet (MSDS) sometimes called Safety Data Sheet (SDS) if a substance is dangerous for supply. Material safety data sheets provide information on chemical products that help users of those chemicals to assess the risks. They describe the hazards the chemical presents, how it may affect a person and give information on handling, storage and emergency measures in case of an accident. The safety data sheet information may lead to guidance appropriate for your task but is **not** a COSHH assessment. The COSHH assessment is what needs to be done to control exposure based upon the activity.

2. SCOPE

All substances used by Keele University which are hazardous to health fall within the scope of this document. This would include all satellite sites unless they fall under the responsibility of the host organisation. The legislation that is covered in this document is primarily COSHH but others include:

- The Control of Substances Hazardous to Health Regulations 2002 (COSHH)
- The Management of Health and Safety at Work Regulations 1999 (Mgt Regs)
- Dangerous Substances & Explosive Atmospheres Regulations 2002 (DSEAR)
- Regulatory Reform (fire safety) Order 2005

The purpose is so you can prevent or reduce workers exposure to hazardous substances by:

- finding out what the health hazards are
- deciding how to prevent harm to health (risk assessment)
- providing control measures to reduce harm to health and making sure they are used
- keeping all control measures in good working order
- providing information, instruction and training for employees and others
- providing monitoring and health surveillance in appropriate cases
- planning for emergencies

Some processes create substances. These could cause harm to employees, contractors, and other people. Sometimes substances are easily recognised as harmful. Common substances such as paint, bleach or dust from natural materials may also be harmful. COSHH covers substances that are hazardous to health. Substances can take many forms and include:

- chemicals and/or products containing chemicals
- fumes, dusts, vapours, mists, gases and asphyxiating gases
- nano materials
- Biological agents that cause diseases such as leptospirosis or legionnaires disease and pathogens used in laboratories. Some substances have their own specific regulations, so they are out of scope for COSHH. These are lead, asbestos, & radioactive substances.

3. DEFINITIONS

<i>COSHH</i>	<i>Control of Substances Hazardous to Health</i>
<i>Composition</i>	<i>Any number of chemicals which make up the product.</i>
<i>WEL</i>	<i>Workplace Exposure Limit</i>
<i>CAS no.</i>	<i>Chemical Abstracts Service – more information can be found here.</i>
<i>PPE</i>	<i>Personal Protective Equipment</i>
<i>MSDS</i>	<i>Material Data Safety Sheet, sometimes referred to as SDS (safety data sheet)</i>
<i>LEV</i>	<i>Local Exhaust Ventilation</i>
<i>MSC</i>	<i>Microbiological Safety Cabinet</i>
<i>CHIP</i>	<i>Chemicals (Hazard Information and Packaging for Supply)</i>

4. ROLES AND RESPONSIBILITIES

Executive Deans and Directors of Professional Services

Are responsible for:

- Ensuring suitable and sufficient risk assessments are carried out for all activities involving substances hazardous to health, associated with their Faculty/Directorate activities including teaching, research and support
- Ensuring that risk assessments are conducted before the activity commences
- Ensuring that the risk assessments are kept up to date, reviewed periodically (at least annually) and revised as necessary when there is any change to the activity, people and locations

Faculty Staff (including Academics, Researchers and Support Staff)

Are responsible for:

- Ensuring that suitable and sufficient risk assessments are carried out for all activities involving substances hazardous to health being undertaken for teaching and/or research within their areas
- Ensuring that all students for which they are responsible, who are undertaking activities involving substances hazardous to health, are made aware of and are familiar with risk assessments relevant to the work being undertaken
- Ensuring that all risk assessments for activities under their control are reviewed annually or sooner if there is a change in people, equipment used, substances used, new or revised relevant legislation or an incident involving the process to which the risk assessment relates

Professional Services (Supervisory) Staff

Are responsible for:

- Ensuring that suitable and sufficient risk assessments are carried out for all activities involving substances hazardous to health being undertaken within their areas of responsibility
- Ensuring that all staff for which they are responsible, who are undertaking activities involving substances hazardous to health, are made aware of and are familiar with risk assessments relevant to the work being undertaken
- Ensuring that all risk assessments for activities under their control are reviewed annually or sooner if there is a change in people, equipment used, substances used, new or revised relevant legislation or an incident involving the process to which the risk assessment relates

Individuals (Staff and Students)

Are responsible for:

- Following the control measures indicated in the risk assessments associated with any activities being undertaken
- Informing their supervisor, lecturer or line manager of any incidents involving substances hazardous to health and/or associated equipment which have or may have caused injury to themselves or others.

The Occupational Health Service

Is responsible for:

- Undertaking referrals where requested for employees reporting health or medical problems that may be adversely affected by their work with hazardous substances.
- providing individuals with confidential advice on health or medical problems relating to the use of hazardous substances
- liaising with the University Health & Safety Unit and Head of Faculty Operations where health or medical problems have been notified.
- referring individuals to the University's Occupational Health Physician as appropriate.

The Health & Safety Unit

Is responsible for:

- Writing, reviewing and issuing overarching Codes of Practice and guidance associated with substances hazardous to health used at the University
- advising and assisting with the provision of suitable training of personnel involved in the use of substances hazardous to health
- making available the information and forms referred to in this Code, either directly or through the University Health and Safety intranet pages.
- liaising with Head of Faculty Operations and Local Safety Officers on the implementation of this Code of Practice
- providing advice to HOFs/Directors, Occupational Health Service and Local Safety Officers on health and safety issues arising from work with substances hazardous to health
- liaising with the Occupational Health Service, Head of Faculty Operations and Local Safety Officer as necessary, where health or medical problems relating to the use of, or exposure to, substances hazardous to health have been notified

The Biological and Genetic Modification Safety Committee

Is responsible for:

- Approving, monitoring and reviewing relevant teaching, research and support activities and advising management, staff and students on relevant health and safety aspects of work associated with biological agents and genetic modification materials. Ensuring suitable and sufficient risk assessments are made where necessary for projects and research where biological agents are involved.

The University Biological Safety Adviser

Is responsible for:

- Advising on all safety aspects relating to biologicals agents and genetically modified materials. Ensuring compliance with all notifications and liaison with the Health and Safety Executive.

Contractors

Are responsible for:

- Providing their Keele University contact with copies of their risk assessments for hazardous substances intended for use on university premises.

Suppliers

Are responsible for:

- Providing suitable and sufficient information by way of manufacturers' safety data sheets and any other relevant information in connection with materials and substances supplied for use by university staff or students.

5. WHAT ARE THE AIMS OF COSHH?

The objective of COSHH is to prevent, or to adequately control, exposure to substances hazardous to health, so as to prevent ill health. This can be done by:

- Using control equipment, e.g., total enclosure, partial enclosure, Local Exhaust Ventilation (LEV)
- Controlling procedures, e.g., ways of working, supervision, and training to reduce exposure, maintenance, examination and testing of control measures
- Worker behaviour, making sure employees follow the control measures
- Changing how often a task is undertaken, or when, or reducing the number of employees nearby, can make an improvement to exposure control.

6. INVENTORIES

It is imperative that you know what substances you have and where they are located. This is for a number of reasons. It enables you to keep records of what substances you have and where they are. It enables accurate reporting of statutory records such as Drug Precursors, CWC etc. It allows us to assess a risk in an emergency situation when we are unable to access a building such as in the event of a fire, and many more reasons. The university uses LabCup to ensure we are able to do this. It will also allow us to see when substances have passed their expiry dates and should be removed and disposed of. This cuts down on risk of vessel deterioration and dehydrated substances that are at increased risk when not maintained.

The use of LabCup is **mandatory** and not optional. It must be engaged with so we are able to understand exactly what we have onsite at Keele and therefore knowing that any associated risks can be managed. LabCup allows us to upload photographs, MSDS sheets and enter things like CAS numbers as unique identifiers. All substances which pose a hazard to health are in scope for COSHH and therefore we need to be assured that these are managed in an appropriate way.

7. COSHH ASSESSMENT

A COSHH assessment needs to be undertaken for the activity in which you are using the substance, rather than the substance itself. This is because the way a substance is used will change the risks that it poses. **The Material Safety Data Sheet or sometimes call the Safety Data Sheet is not a COSHH risk assessment.** It is the information about the properties of a substance and provides information that allows you to consider and factor in when carrying out a suitable and sufficient COSHH assessment. Substances should all have an MSDS/SDS sheet. It will tell you all the information you will need to assess the risk that the substance poses during a particular activity, including any resultant substances that might be produced during the activity. All the COSHH assessments need the MSDS/SDS information before you can begin. It is recommended not to copy and paste information into the COSHH assessment from the MSDS/SDS sheets as this will likely make your assessment unnecessarily lengthy and could be confusing if you are using more than one substance in your activity.

7.1 What does COSHH assessment need to consider?

There are a number of elements that COSHH requires to be considered during the assessment to ensure that it is suitable and sufficient. The elements of Regulation 6 of COSHH are outlined appendix 1. The template that the university provides do look at all these elements and therefore we can ensure that all of the elements are considered within the assessment framework.

7.2 The person who carries out the assessment

- Employers must ensure that whoever carries out the assessment and provides information on the prevention and control measures is competent to do so. A competent person can be someone who is considered to be suitably qualified, experienced, and trained to carry out an activity.
- The person carrying out the assessment may have access to people who can help to deliver the assessment and the implementation of the risk management measures. Employers should ensure everyone appointed to assist in meeting this requirement is competent to do the job and there is formal, written specification for the work that is being planned.
- Where more than one person is involved in carrying out the assessment, the employer should nominate someone to co-ordinate, consult, compile, assure quality, record, communicate and implement the risk management measures and monitor their effectiveness, as well as consider the need for reviewing the assessment.
- The competent person carrying out the assessment should:
 - Know how the work activity uses, produces, or creates substances hazardous to health
 - Have the knowledge, skills, training, and experience to make sound decisions about the level of risk and the measures needed for prevention or adequate control of exposure
 - Have the ability and the authority of the employer to collate all the necessary, relevant information.

8. IDENTIFYING ACTIVITIES

If an activity includes the use of a substance hazardous to health, then a COSHH assessment should be carried out. This activity may also include hazards that may not be substance related, e.g., use of a hotplate or glassware etc. The COSHH assessment form has a section for these hazards to be assessed also.

9. HAZARD & CLASSIFICATION

Identify the class of hazard(s) posed by the substance. These can be found on the MSDS and are referred to the COSHH table's spreadsheet. They may be listed as R-Phrases, S-Phrases and Hazard statements and EUH phrases. Below is an explanation of each. The MSDS will outline the composition of the product into its chemicals and relates this to the R-Phrases associated with the component chemical. These will allow you to identify the hazard classification and the route of entry, i.e., harmful by inhalation etc. On the COSHH Assessment Form these are broken down into their 2 main components - Hazard and Route of Entry.

[EUH-phrases - European Union](#) - The European Union has implemented the GHS through the CLP Regulation. The older system based on the Dangerous Substances Directive was used in parallel

until 2016. Some R-phrases which do not have simple equivalents under the GHS have been retained under the CLP Regulation: the numbering mirrors the number of the previous R-phrase.

[R and S phrases](#) - Hazard classification should be indicated with hazard signs and hazard symbols and/or R phrases as well as S phrases. R phrase and R number: phrases indicating the risks of hazardous preparations and substances, and their numbers respectively. S phrase and S number: phrases related to the safe handling of hazardous preparations, and their numbers respectively. Risk Phrases (R) and Safety Phrases (S) also occur in combinations (combined R and S phrases).

[H and P statements \(GHS / CLP\)](#) - Hazard statement: means a phrase assigned to a hazard class and category that describes the nature of the hazards of a hazardous substance or mixture, including, where appropriate, the degree of hazard.

[Precautionary statement](#) - means a phrase that describes recommended measure(s) to minimise or prevent adverse effects resulting from exposure to a hazardous substance or mixture due to its use or disposal. Hazard statements where the label shall include the relevant hazard statements in accordance with the classification of the hazardous substance or mixture. Precautionary statements where the label shall include the relevant precautionary statements.

10. QUANTITIES

Consider how much is used over a period of time. The [HSE COSHH e-tool](#) can help you assesses the hazard and the risk over the course of the process, not on a daily, weekly, monthly etc. basis.

11. WHO COULD BE EXPOSED TO SUBSTANCES &/OR HAS SPECIAL VULNERABILITIES

Identify who may be at risk such as staff, contractors, visitors, cleaners etc. or anyone walking in the same area as the substance. Particular attention should be paid to

- new and expectant mothers where the substance they are using may have an adverse effect on foetal or neonatal development
- Asthmatics who may be affected
- Those with certain skin conditions
- Untrained staff
- young people and children

12. CONTROL MEASURES

The COSHH regulations set out a hierarchy of control measures to be applied and are set out in order of preference. There is a broad hierarchy of control options available, based on inherent reliability and likely effectiveness. COSHH regulation 7 refers to many of these options. There is a requirement to apply these control measures in order of best effectiveness. They range from Eliminating the hazardous substance as the first application, through to the use of PPE as the last option. These must be complied with as they are set out in the legislation as a specific duty. They include:

- 1st** elimination of the hazardous substance
- 2nd** modification of the substance, process and/or workplace
- 3rd** applying controls to the process, such as enclosures, splashguards, and LEV
- 4th** working in ways that minimise exposure, such as using a safe working distance to avoid skin exposure
- 5th** Protective equipment or devices worn by exposed individuals.

Controlling the risk may include a combination of control measures, so when deciding on an additional control measure, consider the hierarchy of control, including substituting the substance for one that is less harmful, using a lower concentration, using smaller quantity, reducing the number of people that come into contact with the substance, dilution ventilation, extraction systems, label bottles, eye wash bottles etc. Personal protective equipment should be considered as the last resort. Special control measures may be needed for the protection of more vulnerable groups as set out in 11.0.

- Total enclosure of the process and handling systems
- Systems of work that minimise, suppress, or contain the generation of dusts, fumes, aerosols etc.
- Partial enclosure with local exhaust ventilation.
- Local exhaust ventilation
- Sufficient general ventilation
- Reduction in the numbers of employees exposed and restricted access to these areas.
- Reduction of the duration for which staff are exposed.
- Regular cleaning of the area to remove contamination.
- Provision of safe storage and safe disposal of substances hazardous to health.
- Prohibition of eating, drinking, and smoking in contaminated areas.
- Provision of adequate facilities for washing, changing and storage of clothing, including arrangements for laundering contaminated clothing where necessary.
- Personal protective clothing must only be used when despite the application of other control measures there is the risk of exposing our staff to hazardous substances.

If you are unsure of how you should control your substances hazardous to health, you could use the HSE COSHH essentials tool which can be found at <http://coshh-tool.hse.gov.uk/>. The COSHH Essentials tool sets out basic advice on what to do to control exposure to hazardous substances in the workplace. It takes the form of straightforward advice in 'factsheets' called 'control guidance sheets'. There are two types of sheets, industry-specific 'direct advice sheets' and 'generic control guidance sheets'. COSHH Essentials will take you through a number of steps and ask for information about your tasks and chemicals. You can also get direct advice sheets from the HSE which can be found at <http://www.hse.gov.uk/coshh/essentials/direct-advice/index.htm>. Check the direct advice sheets listed by industry to see if there are any direct advice sheets for tasks or processes in your activity. This does not replace the COSHH assessment framework. It is a tool to assist you in deciding the right control measures for a particular substance being used in a certain way.

12.1 PRINCIPLES OF GOOD CONTROL PRACTICE

Good practice in the control of substances hazardous to health can be encapsulated in the eight generic principles set out in Schedule 2A of the COSHH regulations. They can also be referred to as the Hierarchy of Control. They must all be applied to obtain effective and reliable control. The principles overlap in their application. They are not ordered by rank – the first is not more important than the last.

1. Minimise emission, release and spread
2. Consider routes of exposure
3. Choose control measures proportionate to the risk
4. Choose effective control options
5. Personal protective equipment – the final control option
6. Review the effectiveness of controls
7. Provide information and training
8. New measures, new risks

Always try to prevent exposure at source. For example:

- Can you avoid using a hazardous substance or use a safer process – preventing exposure, e.g., using water-based rather than solvent-based products, applying by brush rather than spraying.
- Can you substitute it for something safer – e.g., swap an irritant cleaning product for something milder, or using a vacuum cleaner rather than a brush.
- Can you use a safer form? e.g., can you use a solid rather than liquid to avoid splashes or a waxy solid instead of a dry powder to avoid dust.
- Check your trade press and talk to employees. At trade meetings, ask others in your industry for ideas.

If you can't prevent exposure, you must control it adequately by applying the principles of good control practice. Control is adequate when the risk of harm is 'as low as is reasonably practicable'. This means:

- All control measures are in good working order.
- Exposures are below the Workplace Exposure Limit, where one exists.
- Exposure to substances that cause cancer, asthma or genetic damage is reduced to as low a level as possible.

12.2 CONTROL EQUIPMENT

Control equipment can be general ventilation, extraction systems such as local exhaust ventilation, enclosure, or where the air cannot be cleaned, respiratory protective equipment (RPE). Other control equipment includes spillage capture, decontamination, clean-up procedures and personal protective equipment (PPE).

12.3 WAYS OF WORKING

Control through ways of working includes operating procedures, supervision and training. It includes emergency procedures, decontamination and 'permits to work' for tasks such as maintenance. It also means testing all control measures regularly – equipment, ways of working and behaviour, to make sure that they work properly. You should keep records of examinations, tests and repairs to equipment for at least five years. This helps to identify any trends or variations in equipment deterioration.

12.3 WORKER BEHAVIOUR

Where control measures are in place it is important to use them properly. This includes:

- using control equipment
- following hygiene procedures
- following safe systems of work
- warning supervisors if anything appears to be wrong
- wearing any PPE necessary

13. HEALTH SURVEILLANCE

In certain circumstances, there is a legislative requirement under COSHH and some other regulations which mean that the employer has a duty to monitor any adverse health effects that might occur with the use of substances hazardous to health. Not all people who work with substances need health surveillance. If you work with certain substances in certain ways, you may be required to be referred or refer some of your staff if you are a line manager or supervisor. So, for example if work needs to be undertaken on a substance that is a known respiratory sensitiser and you are unable to do that work using local exhaust ventilation and rely solely on PPE (personal protective equipment), then you are likely going to need health surveillance. There is more about Health Surveillance from Occupational Health.

14. WORKPLACE EXPOSURE LIMITS

HSE has established Working Exposure Limits (WELs) for a number of substances hazardous to health. These are intended to prevent excessive exposure to specified hazardous substances by containing exposure below a set limit. A WEL is the maximum concentration of an airborne substance averaged over a reference period to which employees may be exposed by inhalation.

WELs should not be considered a hard and fast line between safe and unsafe. The principles of good control practice require the degree to which exposure is reduced below the WEL to be proportionate to the health risk. If the principles of good practice are applied for the control of substances hazardous to health correctly, exposure should be below any relevant WEL.

WELs refer to concentrations of hazardous substances in the air that people breathe, averaged over a specified period of time referred to as a time-weighted average (TWA). Two time periods are used: long-term (eight hours), and short-term (15 minutes). These limits cannot be readily adapted to evaluate or control non occupational exposure. (Control of Substances Hazardous to Health, 2013).

14.1 BACKGROUND

Rather than use the calculation methods and air monitoring for determination of workplace exposure limits, it is recommended that control bands are applied to determine safe working practice. This safe working practice should ensure that the substance is and does not become airborne and is thus controlled. Adopting this approach would work for determining safe working practice for substances with an assigned WEL. The approach uses three different bands of required controls, A, B & C. These bands relate to risks and their corresponding controls. Band 'A' being high risk, band 'B' being medium and band 'C' being low. Where the use of the substance is given a WEL, and it is likely that exposures could exceed those limits, then control band A would be used. This would negate the need for establishing the calculations and monitoring mechanisms to control the exposure but applies the principles of good control practice at the top level so that controls are in place and exposures above any WEL is negligible and the risks controlled.

14.2 USE OF CONTROL BANDING FOR WELs

Control band A would dictate that all feasible control methods are used to control exposure to a substance that is inhalable and where the exposure is likely to be that in excess of the Working Exposure Limits given in the EH40. This would include Access controls, LEV's, limiting the quantity used and any RPE that may be applied etc. It is the principle of applying a precautionary approach. This would also be used in the case of a substance that does not necessarily have a WEL assigned to it, but where the health effects of exposure have not yet been scientifically established, e.g. Nano particles.

Control Band B would dictate that all practical control methods are decided by principles of good control practice in line with your COSHH assessment. This may include use of LEV's, limiting quantities used, etc.

Control Band C, for example would be the control measures that have been dictated by a suitable COSHH assessment such as the use of specific PPE or RPE.

14.3 THE CONTROL BANDING MATRIX

Description of the concern category for each Substance Probability of exposure to substance of concern	Concern Category A	Concern Category B	Concern Category C
	Where the substance is in an inhalable* state and a WEL value listed in the EH40	Where the process can change the substance from a non-inhalable* state to a inhalable* state	Where the substance is not listed in the EH40 and no WEL is assigned**
Exposure Category 1 Exposure to substance of concern outside of the WEL is likely	Control Band A	Control Band A	Control Band B
Exposure Category 2 Exposure to substance of concern outside of the WEL is possible	Control Band A	Control Band B	Control Band C
Exposure Category 3 Exposure to substance of concern outside of the WEL is unlikely	Control Band B	Control Band C	Control Band C

**Inhalable state refers to a material state of a substance that can be inhaled. These include dusts, fumes, vapours, gases, mists, airborne pathogens etc.*

***The absence of a WEL does not necessarily mean that the substance is safe. Safe working practice should be determined by a suitable and sufficient COSHH assessment.*

Control Band	Advised Control Measures
A	<p>The hierarchy of control strategy will be strictly applied and all protective measures that are both technically and organisationally feasible will be implemented.</p> <p>Control band A, for example, would dictate that all feasible control methods are used to control exposure to a substance that is inhalable and where the exposure is likely to be that in excess of the Working Exposure Limits given in the EH40. This would include Access controls, LEV's, limiting the quantity used and possible RPE etc. It is the principle of applying the maximum possible precautions. This would also be used in the case of a substance that does not necessarily have a WEL assigned to it, but where the health effects of exposure have not yet been scientifically established, e.g. Nano fibres.</p>
B	<p>According to the hierarchy of control strategy, the technical and organisational protective measures that are feasible are evaluated on the COSHH assessment. Control measures will be based upon COSHH and principles of good control practice shall be applied.</p> <p>Control Band B, for example, would dictate that all practical control methods are decided by principles of good control practice in line with your COSHH assessment. This may include use of LEV's, limited quantity etc.</p>
C	<p>Principles of good control practice shall be applied in accordance with COSHH assessment.</p> <p>Control Band C, for example would be the control measures that have been dictated by a suitable COSHH assessment.</p>

***The absence of a WEL does not necessarily mean that the substance is safe. Safe working practice should be determined by a suitable and sufficient COSHH assessment.*

15. DOCUMENT CONTROL INFORMATION

[The table below should be completed by the document owner and included within every University Policy Document. The version control table will also be uploaded to the University Policy Documents webpage that hosts the procedure.]

Document Name	Control of Substances Hazardous to Health (COSHH) Code of Practice
Owner	David Taylor – Head of Health and Safety, Legal, Governance & Compliance
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Related University Policy Documents	Health and Safety Policy
<i>For Office Use – Keywords</i>	

APPENDIX 1

Regulation 6(2)(a)–(l) requires the risk assessment to consider:

the potential for the substance to cause harm from exposure by inhalation, ingestion, absorption, skin contact and infection (for a biological agent)

the physical attributes of the substance, e.g., liquid, gas, mist, fume, dust or infective state, its ability to become airborne, and the means by which it could come into contact with the skin or other body membranes

the details of when and how exposure can occur and who may be affected, including workers and others

the effectiveness of existing controls and the options for improving control where prevention is not an option.

The risk assessment should consider the work activity, including:

all the substances hazardous to health (including biological agents and simple asphyxiants) arising from the work (used, produced, synthesised, created as waste or by-products, or released from processes or during accidents, incidents, and emergencies)

work done by sub-contractors, at the workplace, that may expose employees to substances hazardous to health.

The risk assessment should consider the hazards, including:

the physical, chemical, and biological properties of the substances and the effects they could have on the body

where those substances are likely to be present and in what form, e.g. dust, vapour, mist, fume etc, and whether they are used or produced, and in what amounts and how often

the additional requirement regarding substances known, or suspected, to be carcinogens, mutagens or asthmagens, where there is a more compelling reason for the employer to substitute a less toxic alternative. Where this is not reasonably practicable, adequate procedures, training, instruction, and supervision should ensure that the exposure level is reduced to as low a level as is reasonably practicable (ALARP).

The risk assessment should consider the people exposed, including:

the ways in which, and the extent to which, any group of people (office staff, night cleaners, security guards, members of the public such as visitors, patients etc) could be exposed. For maintenance workers, where exposure may be foreseeably higher than normal, the type of work and process should be taken into account and any reasonably foreseeable deterioration, or failure, of any control measure provided;

the need to protect particular groups of employees who may be at increased risk, e.g., inexperienced trainees and young people under 18; pregnant workers; disabled workers; and any employees known to be susceptible to certain illnesses such as dermatitis, asthma or other diseases which may be caused or made worse by exposure to substances hazardous to health.

The risk assessment should consider types and extent of exposure, including:

an estimate of exposure, taking into account any information available about:

the concentration in air likely to be produced by the work concerned

the likelihood of skin contact

the effort needed to do the work and how this may affect the rate and volume of air employees breathe (for some work activities, employees might breathe three or four times the volume of air that they would breathe at rest)

the effect of any engineering measures and systems of work currently used for controlling potential exposure

a comparison between the estimate of exposure and any existing, valid standards which help to assess the adequacy of control, e.g., a WEL or 'biological monitoring guidance value'

the key points used to recognise and evaluate exposure in regulation 6(2)(a)–(l). Exposure through all routes must be considered (inhalation, skin contact, absorption through the skin and other body membranes, ingestion, and puncture).