COSHHH Assessments

Guidance for University Departments and Functions

Safety Services Office
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COSHH ASSESSMENTS

1. INTRODUCTION

1.1 The Control of Substances Hazardous to Health Regulations 2002 (as amended), (the COSHH Regulations) are made under the Health and Safety at Work etc. Act 1974 with a view to "protecting persons against risks to their health, whether immediate or delayed, arising from exposure to substances hazardous to health". To achieve this objective, the COSHH Regulations place duties on both employers and employees.

1.2 As required by the Health and Safety at Work etc. Act 1974, the University of Leicester has adopted and published a Statement of Safety Policy and a Statement of Organisation and Operating Arrangements. The Statement of Organisation and Operating Arrangements establishes that management responsibility for health and safety rests with the senior member of staff in each department or function who is responsible for its good conduct in the role of Head of Department.

1.3 Accordingly, Heads of Departments are responsible for implementing the COSHH Regulations within each department or function of the University.

1.4 This document, COSHH Assessments, sets out University policy on the implementation of the COSHH Regulations and gives guidance on the procedures to be followed in order to comply with the Regulations. The guidance given below has been prepared in the light of experience gained in the University since the introduction of the COSHH Regulations in October 1989. Further guidance, including practical advice on handling hazardous substances in accordance with the COSHH Regulations, is given in other University publications, Statement on Safety in Laboratories, Hazardous Chemicals (currently under review), and Hazardous Biological Agents.

1.5 The COSHH Regulations apply to any work involving a substance hazardous to health. Substances hazardous to health are defined in the section 3.2 below. The COSHH Regulations encompass not simply laboratory work with substances hazardous to health, but every work activity using such substances, including, for example, workshop procedures, building and maintenance work, cleaning, catering and office work. Many industrial, commercial and domestic materials and preparations, normally referred to by a trade or brand name, contain substances hazardous to health and their use is subject to the COSHH Regulations.

2. DUTIES UNDER THE COSHH REGULATIONS

2.1 Heads of Departments must ensure that, before any work using a substance hazardous to health is begun, a suitable and sufficient assessment is made of the risks to health created by that work and of the steps that need to be taken to meet the requirements of the COSHH Regulations, and that the assessment is recorded. This may involve the use of a University of Leicester COSHH Assessment Form, or by use of the COSHHatron (discussed in section 5 of this document).

2.2 Heads of Departments must ensure that copies of COSHH assessments are:-

2.2.1 stored centrally within departments and functions, either electronically, or in hard copy format;

2.2.2 made readily available for consultation by those undertaking work to which the assessments refer, and by other members of the department or function;
2.2.3 forwarded to the University Safety Office when any of the circumstances listed in section 3.6.2 apply.

2.3 In the light of the outcome of the COSHH assessment, Heads of Department must ensure that:

2.3.1 appropriate measures are taken to prevent, or where that is not reasonably practicable, adequately control exposure to substances hazardous to health;

2.3.2 control measures and protective equipment are properly used, and maintained in efficient working order and good repair;

2.3.3 effective arrangements are made for the maintenance, examination and testing, at intervals specified in the Regulations, of engineering controls and respiratory protective equipment;

2.3.4 where necessary, arrangements are made for monitoring of exposure to substances hazardous to health and/or for suitable health surveillance of those who are liable to be exposed to such substances;

2.3.5 information, instruction and training are given to employees, students and visitors about the risks presented by their work and the precautions to be taken;

2.3.6 COSHH assessments are reviewed forthwith whenever there is reason to suspect that the assessment is no longer valid or there has been a significant change in the work to which the assessment relates, and otherwise at appropriate intervals.

2.4 University employees and all others working in the University must:

2.4.1 make full and proper use of any control measures, personal protective equipment, etc. provided to prevent or control exposure;

2.4.2 report forthwith any defects discovered in control measures, protective equipment, etc;

2.4.3 co-operate in any necessary health surveillance procedures.

3. GUIDANCE ON COSHH ASSESSMENTS

3.1 General

The central feature of the COSHH Regulations is the assessment of risk to health and of the steps needed to prevent or control exposure.

The aim of a COSHH ASSESSMENT is to make people stop for a moment before they start a particular piece of work and think through the safety aspects of what they plan to do, from the receipt and storage of the materials to the disposal of the end products and waste. They can then judge what risks are involved and ensure that any precautions necessary for their own safety and that of others are worked out and implemented before they begin.

It is important to bear in mind that, even though it is because a substance hazardous to health is to be used that a COSHH assessment is necessary, it is the work to be done, that is to say the process involving the hazardous substance, and not the substance itself, that is the subject of the assessment.
When is a COSHH Assessment Necessary?

No work involving a substance hazardous to health may be undertaken until a suitable and sufficient COSHH assessment has been carried out. In all but the most straightforward cases (e.g. the use of Tipp-Ex), the assessment should be recorded, using either the University COSHH Assessment Form or the COSHHatron.

Substances hazardous to health are defined as:

(a) Substances classified as very toxic, toxic, harmful, corrosive or irritant in Part I of the Approved List, which lists substances that are dangerous for supply within the meaning of the Chemicals (Hazard Information and Packaging for Supply) Regulations (CHIP Regulations). (The appropriate term and/or the corresponding hazard symbol should appear on the package or container in which the material is supplied and on any accompanying Safety Data Sheet).

(b) Substances with a WEL (Workplace Exposure Limit). These substances workplace exposure limits are listed in HSE Guidance Note EH 40, Occupational Exposure Limits (revised annually).

(c) Micro-organisms, which create a hazard to the health of any person. (In practice, any Hazardous Biological Agent in Hazard Groups 2, 3 or 4). This document does not cover risk assessment of work with these agents. For more information, refer to the University document Hazardous Biological Agents.

(d) Dust of any kind, when present at a substantial concentration in air.

(e) Any other substance, which creates a comparable hazard to health to any of the above.

This means that substances hazardous to health include:

(i) Substances having long-term (chronic) effects, such as carcinogens, teratogens, mutagens, cumulative poisons, etc., as well as those producing immediate (acute) effects.

(ii) Mixtures and preparations as well as single substances.

(iii) Commercial products, such as cleaning materials, paints and varnishes, pesticides, etc., which contain substances hazardous to health.

(iv) End-products and by-products of processes as well as starting materials.

(v) Allergens, respiratory and skin sensitisers.

(vi) Hazardous impurities in other substances.

(vii) Asphyxiants

It should be noted that the COSHH Regulations do not apply to the use of the large number of substances, which do not fall within the categories above. Nor do they apply to substances, which are dangerous solely by virtue of their physical properties (e.g. radioactive, flammable, explosive, high or low temperature, high pressure). Nevertheless an assessment of risks and of the precautions required to minimise those risks, along similar lines to a
COSHH assessment, is recommended as good practice in any hazardous situation (see the DSEAR guidance document on the Safety Services website for further details).

3.3 **Is it Necessary to do a Separate Assessment for each Substance Used?**

3.3.1 **Generic assessments**

In many circumstances, it may be possible to reduce the number of separate assessments by preparing **generic assessments**. When the work involves the use of a variety of substances hazardous to health, as is often the case in research laboratories, it may be more convenient to group the substances appropriately and to assess risks and precautions for each group, rather than for each substance individually. Substances can be grouped on the basis of chemical properties, that is to say similar hazards, or because they are used in a similar manner. Examples of grouping based on chemical similarities include:

(i) a family of reagents, such as hydride reducing agents, used in a similar manner;

(ii) similar compounds being tested as starting materials in a chemical synthesis;

(iii) compounds in a homologous series being used in a similar way.

Examples of grouping based on use include:

(iv) compounds with similar pharmacological properties being tested in a particular system;

(v) solvents used in an analytical or spectroscopic procedure.

When a generic assessment is made, it is acceptable practice to treat all substances in the group on the basis of 'gearing up' to the most hazardous member of the group. Alternatively, where one (or a few) member(s) of the group are especially hazardous (for example, carbon tetrachloride, chloroform and ethylene dichloride among chlorinated solvents) it may be appropriate to assess these compounds separately from the remainder of the group, since their use may require more stringent precautions.

3.3.2 **Process assessments**

Where a process involves a number of hazardous substances it may be convenient to prepare a single assessment covering the whole process - a **process assessment**. It will be necessary to give hazard information about all the hazardous substances involved in the process, and to assess which substance(s) give rise to the greatest risk in the use being assessed, bearing in mind the possibility that exposure to different substances may arise by different routes. The precautions to be taken can then be geared to controlling exposure to the highest-risk material(s). In multi-step processes, it may be possible to vary the precautions taken at different stages as the risks change.

This approach may be suitable, for example, with:

(i) **Procedures in frequent use.** In such cases, there will often be a written protocol for the procedure, which should include information on the hazards
of the substances used and the precautions to be taken. If a copy of the protocol is attached to the COSHH Assessment Form, only information not included in the protocol need be given on the form.

(ii) Chemical reactions, multi-step syntheses, etc. Starting materials, reagents, intermediates and products can all be included in a single assessment. It may also be possible to frame the assessment to cover the testing of a range of different reagents, conditions, etc., by gearing the precautions to be commensurate with the variant causing the greatest risks. See also Section 3.3.3 below for the assessment of novel and unidentified compounds.

Remember, however, that it will be necessary to consider the risks that may be caused by each of the hazardous substances involved in a process when deciding on procedures to be followed in emergencies, on suitable disposal methods and on storage conditions for the separate materials.

3.3.3 Novel and unidentified compounds

A special problem is posed by chemical processes where novel compounds are being formed, and unidentified by-products may arise. In such cases, it is recommended that all new compounds and by-products should be treated as TOXIC, except in those instances where more serious hazards can reasonably be anticipated, in which event a full and specific assessment is necessary.

3.4 Who should Carry Out COSHH Assessments?

As in all aspects of health and safety, final responsibility for ensuring that COSHH assessments are carried out and their conclusions implemented rests with the Head of Department.

It will generally be appropriate for the Head to designate senior members of the department or function with suitable expertise and experience, such as academic staff, departmental managers, senior technical and research staff, to deal with COSHH assessments in specific areas of the work of the department. This duty involves overseeing the preparation of COSHH assessments, approving the assessments as 'suitable and sufficient' by signing the declaration at the foot of the University COSHH Assessment Form, and ensuring that the precautions required by the assessment are put into effect.

The detailed work of preparing the assessment, such as gathering hazard information and making a preliminary assessment of risks and precautions, may often be done by junior members of a department (research students, junior technical staff, undergraduate project students, etc.) and should form part of their training. However, this must always be done in consultation with a senior member, who must check that the risks are correctly stated and that the precautions required are appropriate to the risks before approving and signing the assessment.

Those preparing COSHH assessments, and particularly those designated to approve assessments, must be familiar with:

(i) Approved Code of Practice - Control of Substances Hazardous to Health 2002 (as amended)

(ii) Hazardous Chemicals (University of Leicester) (currently under review).

(iii) Carcinogens, notes for guidance (University of Leicester)
It is important that those preparing and approving assessments should be conscious of the limits of their knowledge and experience and should work within them. **When assessors feel unsure about any aspect of an assessment they should always seek advice from someone more expert** in the topic under consideration. If such a person is not available within the same department or function, it may be necessary to seek help from outside, for example from another department or from a manufacturer or supplier. Alternatively, the University Biological & Chemical Safety Officer may be able to help.

3.5 **The Principal Steps in Carrying Out a COSHH Assessment**

The key element in a COSHH assessment is the planned use of the substance. The aim of the assessment is to judge the risks arising in a **particular planned use** (or a group of similar uses giving rise to similar risks) and so to determine the precautions, etc., necessary to prevent or control exposure to the hazardous substances in that particular use.

**STEP ONE - HAZARD INFORMATION** (Section 2 of University COSHH Assessment Form)

Information is required on the **HAZARD** associated with the substance. The **HAZARD** presented by a substance is its potential to cause harm and is independent of the planned use. Hazard information is available from manufacturers’ data sheets, computerised databases (such as the Sigma-Aldrich data base), reference books, etc.

**STEP TWO - USE OF THE SUBSTANCE : EXPOSURE POTENTIAL** (Sections 3 and 4 of the Form)

Assessment requires consideration of the risk arising in the actual circumstances of the work to be done. Details of the use to be made of the substance are therefore crucial to the assessment, and different assessments may be necessary for substantially different uses of the same substance. Factors arising from the way the substance is to be used, including the amount, the physical nature of the substance, the frequency of use and the extent to which the substance is contained while it is in use, contribute to an assessment of the likelihood that a worker may be exposed to the substance in the particular use under consideration - the **EXPOSURE POTENTIAL**.

**STEP THREE - ASSESSMENT OF RISK** (Section 5 of the Form)

The **RISK** to health is the likelihood that the substance will cause harm in the actual circumstances of use. It cannot be over-emphasised that a simple statement of the hazards associated with a substance is not a risk assessment. The aim is to reach a conclusion about the degree of risk to health involved in the particular planned use of a hazardous substance, leaving aside, at this stage, the effects of any precautionary measures. Assessors will need to take account, using their best judgement, both of how hazardous the substance is and of the likelihood of exposure to the substance in the course of the planned use, i.e.  

**RISK = HAZARD x EXPOSURE POTENTIAL**

Assessors should also consider what route(s) of contact (inhalation, skin contact, etc.) are likely in the proposed use since the degree of risk may be different by different routes and this will affect the precautions needed to control exposure.

**STEP FOUR - PRECAUTIONARY MEASURES** (Sections 6 and 7 of the Form)
In the light of the assessed RISK, appropriate PRECAUTIONARY MEASURES must be agreed and put into effect, so that exposure to substances hazardous to health will be prevented or, when this is not reasonably practicable, adequately controlled. It may be that simple routine precautions, such as those covered by 'good laboratory practice', will be sufficient. In other cases, more stringent precautions, such as performing the operations in a fume cupboard or glove box, or wearing a respirator, will be necessary. These should be specified on the assessment form. In addition to the precautions to be taken in normal use, the steps to be taken in an emergency, such as a spillage or the failure of containment, must be stated, as also must any precautions necessary in the storage of the material and its disposal once its use is complete.

STEP FIVE - INFORMATION, INSTRUCTION AND TRAINING (Section 8 of the Form)

Users of a hazardous substance must be INFORMED of the hazards presented by the substance and of the risks to their health associated with its use, INSTRUCTED in the system of work and other precautions to be employed, and TRAINED in any procedures, use of equipment, etc. with which they are not familiar.

In certain cases, further steps may be necessary (Section 10 of the Form), including the maintenance, examination and testing of control measures (fume cupboards, RPE, etc.), air monitoring of exposure to the hazardous substance and health surveillance of those using it.

3.6 Use, Storage and Review of COSHH Assessments

3.6.1 Distribution of copies

The COSHH Assessment Form can be downloaded from the Safety Services CWIS page. Alternatively the COSHHatron may be used for risk assessments (see section 5). It is recommended that copies of the completed forms should be distributed as follows:

(i) One signed, hard copy should be kept as close as possible to the location where the work is to be done (for example, within the particular laboratory), so that it is readily available for consultation by those undertaking the work, particularly in case of emergency, and for training workers about to begin the work that is the subject of the assessment.

(ii) One copy should be stored centrally in the department or function to serve as a record and to be available for consultation by other members of the department or function. These can be electronic or hard copy records.

(iii) Where any of the circumstances listed in Section 3.6.2 below apply, one clearly legible copy must be sent to the University Safety Office.

Procedures for collecting and storing completed COSHH Assessment Forms within a department, or function, should be determined by the Head of Department.

3.6.2 Copy of assessment to be sent to the Safety Office

One legible copy of the assessment must be sent to the University Safety Office whenever:

(i) Monitoring of exposure or health surveillance is required as a result of the assessment.
(ii) The assessment shows that there is doubt about whether adequate control of exposure can be achieved.

(iii) The substance is on the Anti-Terrorism, Crime and Security Act pathogen/toxin list

(iv) There is any doubt about any aspect of the assessment.

3.6.3 Review of assessments

The COSHH Regulations require that an assessment should be reviewed forthwith if:

(i) There is reason to suspect that the assessment is no longer valid (for example, from testing of local exhaust ventilation, from monitoring of exposure, from health surveillance, or when new information about the hazards of substances becomes available).

(ii) There has been a significant change in the work to which the assessment relates (for example, in the equipment used, in methods of work, in the scale of the operations or in the skill and experience of those doing the work).

In addition, all assessments should be reviewed at regular intervals to check that they are still appropriate to the circumstances of the work being carried out. The interval between reviews should not be greater than five years for uses involving a low degree of risk. For higher risk procedures, reviews should be undertaken more frequently.

4. NOTES ON COMPLETING THE UNIVERSITY COSHH ASSESSMENT FORM

4.1 Types of Assessment

Both the University COSHH Assessment Form and the COSHHatron are designed for the assessment of:

(i) a specific use (or a group of similar uses) of a single material, whether a pure substance or a mixture such as a commercial preparation;

(ii) use of a group of substances related either by similar chemical properties (i.e. similar hazard) or by use in a similar manner, in the form of a generic assessment (see section 3.3.1);

(iii) a complex process involving several hazardous substances, in which case all the substances should be listed and hazard information, etc. given on each (see section 3.3.2).

In most cases, there will be sufficient space to give all the information needed for a suitable and sufficient assessment. Additional sheets, for example manufacturers’ safety data sheets, experimental protocols or specifically prepared information sheets, may be attached to the form or hard-copy of the COSHHatron assessment if additional space is required or if this is the most convenient way to give the information.

For Hazardous Biological Agents, use the form 'Application to Handle Hazardous Biological Agent', copies of which may be obtained from the Safety Office, or can be found on the Safety Services web page.
4.2 **SECTION 2 - Hazardous Substance**

4.2.1 **Name of substance**

Give the chemical name of the substance or another name that will identify the substance clearly. The Chemical Abstracts Service (CAS) number is a convenient and unambiguous identifier, which can usefully be given alongside the name, when it is known or available, e.g. from manufacturers' label or data sheet. For commercial preparations and mixtures, give a brand or trade name and, wherever possible, the composition of the mixture including the chemical name(s) of the hazardous compounds(s).

4.2.2 **Class of Hazard**

Tick the box(es) against the appropriate standard hazard term(s), according to the material safety data sheet.

4.2.3 **Health effects**

Give details of the health effects of hazardous substances to supplement the standard hazard term(s) ticked under 'Class of Hazard' (see section 4.2.2). For example, include, where it is available and relevant, information on the nature of the health effects, whether acute or chronic, what organs are particularly affected, etc. In general, the more hazardous a compound is, the more desirable it becomes to give detailed information on health effects.

Examples of suitable phrases to describe health effects are given in Appendix 2. Other suitable phrases will be found in manufacturers' safety data sheets and other compilations of hazard and safety information (see Hazardous Chemicals booklet).

**When a compound is a known or suspected carcinogen, teratogen or mutagen, tick the appropriate box(es).**

4.2.4 **Hazard category**

Materials should be assigned to a hazard category:

- **LOW**
- **MEDIUM**
- **HIGH**
- **EXCEPTIONAL**

as follows:

4.2.4.1 **Exceptional:**

(i) Substances of known or suspected life-threatening toxicity, including all compounds classified 'Very Toxic' under the CPL Regulations.

(ii) Known or suspected human carcinogens (refer to the University guidance document Carcinogens for further details):

(A) Substances assigned the risk phrase "R45: may cause cancer";
(B) Substances and process listed in Schedule 1 of ACOP and guidance Control of Substances Hazardous to Health

(iii) Known and suspected human teratogens and mutagens.

(iv) Any other substance presenting a comparable hazard to health to any of those listed above.

4.2.4.2 High

(i) Substances designated 'Toxic' or 'Corrosive' (CPL Regulations).

(ii) Animal and experimental carcinogens, not included in the 'Exceptional' category.

(iii) Experimental teratogens and mutagens, not included in the 'Exceptional' category.

(iv) Any substance presenting a comparable hazard.

4.2.4.3 Medium

(i) Substances designated 'Harmful' or 'Irritant' (CPL Regulations).

(ii) Any substance presenting a comparable hazard.

4.2.4.4 Low

Substances presenting a lower degree of hazard than the criteria for classification as 'Harmful' or 'Irritant' under the CPL Regulations. Such substances do not normally require the completion of a full COSHH assessment.

4.2.5 Explosive atmospheres and DSEAR

Substances that are hazardous to safety are subject to the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). These will include substances with the following properties:

- 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).

If a substance you are planning to use falls within these categories, more information about DSEAR in the laboratory can be found in the DSEAR guidance document on the Safety Services Website.

4.2.6 Anti-terrorism, Crime and Security Act

In 2001 the Anti-terrorism, Crime and Security Act was introduced. Schedule 5 of this act lists a number of pathogens and toxins. Under section 7, it is stated that users of the listed pathogens or toxins must declare their use. If you are using, or intend to
use a substance listed in Schedule 5, you must report it to the Biological and Chemical Safety Officer (Sarah Nelson, sc128@le.ac.uk, ex 2020). Schedule 5 of the Act can be found here: http://www.le.ac.uk/safety/documents/pdfs/schedule5list.pdf

4.2.7 Workplace exposure limits

Workplace exposure limits (WEL) have been established for a number of substances, and are intended to stop excessive exposure to these substances. The WEL is the maximum concentration of an airborne substance averaged over a specific time-period (specified in the guidance) to which someone can be exposed to. WEL values can be obtained from the HSE Guidance Note EH 40, Workplace Exposure Limits (revised annually), or can be found at: http://www.hse.gov.uk/coshh/table1.pdf

4.2.8 New substances

When assessing a new substance or one for which adequate hazard information is not available, information from chemically related substances may give a useful guide to the likely hazards. In such cases, it is important to err on the side of caution and to treat any substance for which sufficient information is lacking as a potentially serious hazard. All new compounds and by-products should be treated as TOXIC, except when a more serious hazard can reasonably be anticipated (see section 3.3.3).

4.3 SECTION 3 - Use of Hazardous Substance

Indicate briefly the nature of the use that is the subject of the assessment. If a written protocol is available, attach a copy to the form.

4.4 SECTION 4 - Exposure Potential

The approach used is based on that developed by the Royal Society of Chemistry in its booklet, COSHH in Laboratories. It aims to assess the overall exposure potential in any particular use of a hazardous material by considering the individual exposure factors set out in this section of the form.
### 4.4.1 Physical characteristics affecting exposure

<table>
<thead>
<tr>
<th>Exposure potential</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Low (Dense solid/non-volatile liquid) | Dense solids  
Non-volatile liquids  
Substances not absorbed through the skin |
| Medium (Dusty solid/volatile liquid) | Light, powdery solids  
Lyophilised materials  
Dust-forming materials  
Volatile liquids  
Substances poorly absorbed through the skin |
| High (Gas/aerosol/highly volatile liquid) | Gases, vapours  
Aerosols  
Highly volatile liquids  
Substances readily absorbed through the skin  
Substances that promote skin absorption of other substances |

### 4.4.2 Primary containment

Take account only of the equipment in which the operations are to be performed (e.g. open vessel, distillation apparatus, vacuum line, etc.) and **NOT** of any secondary containment, such as a fume cupboard, glove box, etc. (Secondary containment will be specified in Section 6 of the form).

<table>
<thead>
<tr>
<th>Exposure potential</th>
<th>Primary containment of operations</th>
</tr>
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| Low (Closed system) | Predominantly closed system  
Low chance of mishap |
| Medium (Partially closed system) | Partially closed system (for example, system with restricted opening, e.g. reflux condenser, or one that is opened for only a short time, e.g. to make additions, take samples, etc.)  
Low chance of mishap |
| High (Open system) | Open vessel  
No physical barrier between hazard material and user  
Any use with medium or high chance of mishap |
4.4.3 Frequency of use

The criteria given below for frequency of use are intended to be indicative rather than absolute.

<table>
<thead>
<tr>
<th>Frequency of use</th>
<th>Indicative criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occasional</td>
<td>Use averaging less than 2 hours per week over an extended period. Use on a small number of occasions (less than 10) after which use will cease.</td>
</tr>
<tr>
<td>Frequent</td>
<td>Regular daily use for 1-2 hours per day or less. Regular use for several hours on one or two working days per week.</td>
</tr>
<tr>
<td>Continuous</td>
<td>Use for several hours per day on all or a majority of working days.</td>
</tr>
</tbody>
</table>

4.4.4 Overall exposure potential

The overall potential for exposure to the hazardous substance should be assessed as:

Negligible  Low  Medium  or  High

in the light of the individual exposure factors above. On the form, factors contributing to a high overall exposure potential are placed to the right hand side of the page, whereas those towards the left hand side make a lower contribution to the overall exposure potential. The more boxes for individual factors that are ticked on the right hand side of the form, the higher the overall exposure potential should be. **However, the assessment cannot be based on a simple count of high or low factors, but must rely on the judgement and experience of the assessor.**

4.5 SECTION 5 - Risk Assessment

4.5.1 Route(s) of contact

Tick the routes of contact likely to occur in the use described. The routes most likely to occur in work in the University are inhalation, skin contact, eye contact and accidental injection. The situations which traditionally gave rise to ingestion (swallowing) of hazardous substances were mouth pipetting and eating, drinking, etc. in places where hazardous substances are handled, neither of which should take place nowadays. The possibility of ingesting small quantities may still arise from splashes, etc. falling on the lips or by transfer from contaminated gloves.
4.5.2 Assessment of risk to health

The risk to health in the use described should be assessed qualitatively as:

- Negligible
- Low
- Medium
- or
- High

At this stage it should be assumed that no special precautions have been taken. The assessment of the risk to health should not take account of precautionary measures such as the wearing of person protective equipment (gloves, safety spectacles, particle mask, etc.), performing operations in a fume cupboard, or the use of local exhaust ventilation. The precautions necessary to reduce the risk to an acceptable level will be dealt with in the next section of the form.

The risk will depend both upon the hazard category of the substance and upon the degree of exposure to it during use, i.e.

\[
\text{Risk} = \text{Hazard} \times \text{Exposure Potential}
\]

Frequent or large-scale exposure to a substance of medium hazard rating may be as harmful to health as a single exposure to a small amount of an exceptionally hazardous substance.

As with exposure potential, boxes ticked on the right hand side of the page for hazard factors and for exposure factors contribute towards a greater risk to health, whereas those towards the left hand side make a smaller contribution.

Note that different degrees of risk may arise from exposure by different routes, and that the risk arising from each likely route should be separately assessed.

If you are in doubt about any aspect of the assessment, it is essential that you seek further advice.

4.6 SECTION 6 - Precautions Necessary in Handling and Use

4.6.1 Precautions in handling and use

As stated in regulation 7(2) of the COSHH Regulations, first consideration must always be given to replacing the hazardous substance with a less hazardous (preferably non-hazardous) one.

When this is not practicable, specify the precautions to be taken in order to prevent or control exposure to the hazardous substance(s) at all stages of the planned use. Remember operations such as weighing, dispensing and preparing stock solutions as well as the actual experimental use. The precautions should be devised to be commensurate with the assessed risk and appropriate to the expected route(s) of contact.

Precautions that should be considered include (the list is not exhaustive):

- Use of secondary containment;
  - Fume cupboard or other local exhaust ventilation.
  - Fully-enclosed glove box or safety cabinet.
Redesign of the equipment used so that the hazardous material is better contained.

Use of Personal Protective Equipment (PPE):
Overall or laboratory coat.
Eye protection - safety spectacles or goggles
Gloves
Face shield.
Additional protective clothing, such as plastic apron, boots, long gauntlets.
Appropriate particle mask.
Other respiratory protective equipment (RPE).

A general guide to the use of personal protective equipment (PPE) can be found at: [http://www.hse.gov.uk/pubns/indg174.pdf](http://www.hse.gov.uk/pubns/indg174.pdf)

This section of the COSHH Assessment Form has sub-sections for hand, eye, face, body and respiratory PPE. However, it is likely this will not cover all precautions. Any other precautions, such as "Avoid skin contact", "Do not breathe vapour/dust", and the specific measures to be taken, for example, "Use in a fume cupboard" should be written in the ‘other’ section. When a written protocol for the procedure is available and includes details of the precautions to be taken, there is no need to repeat the precautions on the form. Simply attach a copy of the protocol and tick the boxes.

4.6.1.1 Hand protection
Gloves of a suitable material should be worn whenever the assessment shows a significant risk from skin contact. Gloves must be of a material which is resistant to and not penetrated by the substances in use. A guide to glove selection can be found at: [http://www.le.ac.uk/safety/documents/pdfs/glove-guide-0112.pdf](http://www.le.ac.uk/safety/documents/pdfs/glove-guide-0112.pdf)

4.6.1.2 Eye and Face protection.
Prevention of eye injury deserves special attention; the eye is particularly vulnerable to physical and chemical damage. Depending on the risk, it may be suitable to provide safety spectacles or eye shields, or safety goggles. A guide to eye protection can be found at: [http://www.le.ac.uk/safety/documents/pdfs/eye-guide-0206.pdf](http://www.le.ac.uk/safety/documents/pdfs/eye-guide-0206.pdf)

For hazardous operations such as conducting reactions which have potential for explosion, or using and mixing strong acids and alkalis, the use of an explosion shield should be considered, alongside the use of a face shield, or a combination of face shield and safety goggles or glasses.

4.6.1.3 Respiratory protection
The selection and use of respiratory protective equipment should be carefully considered. It must provide the wearer with effective protection and be suitable for the intended use. It must also be selected, used, maintained and tested by properly trained people, and be stored correctly.

4.6.1.4 Specialist clothing
 Protective clothing should be worn in a laboratory. The Howie-style lab coat is most suitable for lab work. However, users must be aware that some
chemicals will require further protection. This may include coveralls, disposable aprons and self-contained suits.

4.6.2 Special storage precautions

Make a note of any special storage conditions necessary to minimise risk from the substance, for example:

Keep in a locked cupboard
Keep in a fireproof cabinet
Keep cool/dry/in the dark
Keep away from acids/alkalis/oxidising agents/oxidisable materials.

4.6.3 Disposal

Give practical details of what is to be done with end products and waste material, by the person(s) handling the materials. For example:

Wash down the drain with a large excess of water.
Neutralise with acid/alkali and then wash down the drain with a large excess of water.
Treat with ... (give details) ... and then wash down drain with plenty of water.
Place in waste solvent bottle.
Place in waste chlorinated solvent bottle.
Bag up and place in solid waste.
Bag up/put in a securely sealed container, label and take to ..........................................................* for disposal by waste contractor.

(*location indicated in departmental rules)

It is inappropriate to put "Burn in an incinerator equipped with after-burner and scrubber" or any other instruction that cannot be carried out within the University. Disposal instructions should be realistic and capable of being carried out by, or under the control of, those whose work is the subject of the assessment.

4.7 SECTION 7 - Emergency Procedures

4.7.1 Emergency procedures

Give procedures for dealing with any spillages - in quantities up to the full amount in the stock container.

Procedures for clearing up a spillage include:

The use of a purpose-bought spill kit to contain and absorb spillages
Wash to drain with a large excess of water (after neutralisation or other chemical treatment, if appropriate).
Add a dispersing agent and work into an emulsion before washing to drain with a large excess of water.
Absorb on a suitable absorbent, place in a sealed container and label for disposal by an appropriate route (e.g. disposal by waste contractor).
Sweep up solid material, place in a sealed container and label for disposal.
Ventilate area to disperse vapours.
After clearing bulk of spillage, wash down area to remove residues.

Other specified emergency procedures must cover any reasonably foreseeable emergency, such as:

- Escape of gas or vapour.
- Failure of containment, e.g. fume cupboard.
- Failure of services, e.g. water to a condenser.

To deal with an emergency it may be necessary, for example, to:

- Shut off all sources of ignition.
- Wear special protective clothing (face shield or goggles, gloves, rubber boots, etc.).
- Wear respiratory protective equipment (RPE).
- Evacuate and seal off area.

Departmental Laboratory Safety Booklets should contain details of departmental procedures for dealing with spillages, etc., in which case a reference to the appropriate procedure in the departmental booklet will suffice.

4.7.2 First aid

Standard first aid procedures for dealing with cases of inhalation, ingestion, eye contact and skin contact apply to most hazardous materials and are given in standard texts such as First Aid Manual (8th edition) or Bretherick Hazards in the Chemical Laboratory. If standard procedures are suitable for the substance under assessment, tick the box.

4.8 SECTION 8 - Information, Instruction and Training

4.8.1 Source(s) of information

Give a reference to any source of information used in preparing the assessment and/or useful in training workers undertaking the work described in the assessment.

4.8.2 Training required

Give details of how information, instruction and training are to be given to any worker (other than those preparing the assessment) who is about to begin using the hazardous substance in the work that is the subject of the assessment. Include the name(s) of the person(s) who will give instruction and training, if they are different from the person signing the assessment.

4.9 SECTION 9 – Final Assessment

Unlike the risk assessment in section 5, this assessment takes into consideration containment measures and precautions for handling and use.

The risk to health should be classed as either:
4.10 **SECTION 10 - Actions to Implement this Assessment**

4.10.1 **Actions to implement assessment**

Give here any actions necessary to implement the precautions required as a result of the assessment, for example:

- Preparation of a written protocol for the procedure.
- Installation of containment equipment, local exhaust ventilation (LEV), etc.
- Arrangements for maintenance and testing of LEV and RPE.

4.10.2 **Monitoring of exposure and health surveillance**

When the assessment indicates a need for monitoring of exposure and/or health surveillance, the matter should be discussed with the Safety Office and arrangements agreed. The COSHH Regulations require that records of monitoring of exposure and health surveillance should be kept for 40 years where the information relates to specific individuals and for 5 years in other cases.

4.10.3 **Copy of assessment to be sent to the Safety Office**

One clearly legible copy of the assessment form must be sent to the University Safety Office if any of the circumstances listed in 3.6.2 above apply.

4.10.4 **Review of assessment**

Give the date for periodical review of the assessment (see section 3.6.3 above).

4.11 **SECTION 11 - Declaration**

The declaration should be signed only by a suitably experienced member of the department, and only after that person has satisfied themselves that the assessment is "suitable and sufficient", that is to say that the hazards are correctly stated and the risks appropriately assessed, and that measures to control exposure, commensurate with the risks, have been agreed and implemented.

4.12 **Other details of the COSHH Assessment Form**

The second page of the COSHH assessment form contains notes on how to complete the form correctly. These act as reminders of the details in this booklet. The page also includes links to all documentation required to complete the form (for example, The Anti-terrorism, Crime and Security Act 2001 pathogen/toxin list).

5. **THE COSHHatron**

The COSHHatron is computer programme designed to make COSHH assessment simpler. It has been designed to resemble the University of Leicester's traditional COSHH assessment
form in terms of layout and questions asked. It also incorporates recent modifications prompted by changes in the law, and also any further questions required by the University Hospitals of Leicester NHS Trust. Furthermore, it has been designed to remove as much of the "robotic" aspects of risk assessment as possible, so that you can concentrate on the important decisions. However, as with any risk assessment, the onus is on you to provide correct information about your use of the substance, not all possible uses (which is the default on Material Safety Data Sheets).

If you wish to install, or try the COSHHatron, go to: http://wads.le.ac.uk/coshhatron/Help/1streadmecoshhatron.htm, choose “local installer” (not organisation), and you will be guided through the process.

For further details on the COSHHatron, please contact Sarah Nelson (Biological and Chemical Safety Officer, sc128@le.ac.uk, ex 2020) or Gareth Bicknell (UHL R&D Laboratory Safety Co-ordinator/Lab Manager, Transplant Surgery, grb4@le.ac.uk, phone 258-4683).
REFERENCES

University Safety Publications

(Available from the University Safety Office website: www.le.ac.uk/safety)

1. Statement of Safety Policy
2. Statement on Safety in Laboratories
3. Hazardous Chemicals
4. Hazardous Biological Agents
5. Carcinogens
6. Transport of Dangerous Goods by Road
7. Waste Disposal

Legislation and Regulations

(Available from HMSO and the University Bookshop)

8. Health and Safety at Work etc. Act 1974
9. Control of Substances Hazardous to Health Regulations 2002 (as amended)
10. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (as amended)

HSC and HSE Publications

(Available from HMSO and the University Bookshop)

11. Approved Codes of Practice: Control of Substances Hazardous to Health (2002 as amended)
12. Guidance Note EH 40, Occupational Exposure Limits (Published annually by HMSO on behalf of the Health and Safety Executive).

Other Publications

PHRASES DESCRIBING HEALTH EFFECTS

Given below are examples of the type of phrases that are appropriate for describing health effects in section 2 of the COSHH Assessment Form. Other suitable phrases will be found in manufacturers' safety data sheets and in compilations of health and safety information.

- Very toxic by inhalation/skin contact/ingestion.
- Toxic by inhalation/skin contact/ingestion.
- Harmful by inhalation/skin contact/ingestion.
- Causes burns/severe burns.
- Irritating to eyes/skin/respiratory system.

Known human carcinogen.
- Causes leukaemia/cancer of the lungs/skin/liver/bladder.
- Suspected human carcinogen; causes tumours in animals.
- Causes reproductive effects; teratogen in animals.
- Potent mutagen.

Acute toxicity: causes damage to liver/kidneys/gastro-intestinal tract/other organs.
- Prolonged or repeated exposure to small doses may cause damage to liver/kidneys/other organs.
- Causes nervous system disturbances.
- Causes haematological effects/methaemoglobinemia.
- Inhalation/swallowing may cause: headache/nausea/vomiting/cyanosis/unconsciousness.
- Vapour is narcotic.

Inhalation of vapour/dust is irritating/severely irritating to upper respiratory tract.
- May cause inflammation, oedema and spasm of upper respiratory tract.
- Vapour/dust is irritating/severely irritating to mucous membranes.
- Causes destruction of tissues of mucous membranes/skin/eyes/respiratory system.
- Lachrymatory.

May cause dermatitis/severe dermatitis.
- Prolonged or repeated contact may cause dermatitis.
- May cause sensitisation of respiratory tract by inhalation of vapour/dust.
- May cause sensitisation by skin contact.
- May cause acute allergic reactions/asthma.
- Possibility of allergic reactions/asthma in sensitive individuals.
EXAMPLE OF A COMPLETED COSHH ASSESSMENT FORM

An example of a completed COSHH Assessment Form is reproduced on the following page. It is designed to illustrate the use of the new form rather than to be definitive assessments that can be applied universally. Any assessment should be prepared in the light of the particular circumstances in which the hazardous substance(s) will be used, and these may differ from the circumstances envisaged when preparing the assessments given here.

Notes on the Assessment

**Toluene**

Toluene is classified as 'Harmful', a relatively low hazard rating, although one still requiring a COSHH assessment to be completed. Nevertheless, toluene requires due care in handling, particularly because of its volatility. This assessment covers the use of relatively small volumes (less than 100ml) of toluene.
COSHH Assessment Form

1. DEPARTMENT……University department…………………………………………………………..Position…Senior technician………………………………………..

2. HAZARDOUS SUBSTANCE (or group of substances)…Toluene………………………………………………………………………………………………………………

   Class of Hazard
   Harmful  ☑️ Toxic  ☑️ Very Toxic
   Irritant  ☐ Corrosive  ☐ Carcinogen
   ☑️ Highly Flammable  ☐ Explosive
   ☐ Teratogen  ☐ Mutagen

   Health effects harmful by inhalation, skin contact, ingestion. Absorbed through skin. Irritating to skin and eyes. Narcotic in high concentrations…………………..

   HAZARD CATEGORY  Low  ☐ Medium  ☑️ High  ☐ Exceptional

   Is there a risk of an explosive atmosphere developing? YES/NO. If yes are DSEAR control measures in place? YES/NO

   Is the substance on the Anti-terrorism, Crime and Security Act 2001 pathogen/toxin list? YES/NO

   Are there workplace exposure limits for this substance? YES/NO. If 'yes' please state limits 50 ppm (8 hr)…………………..

3. USE OF HAZARDOUS SUBSTANCE  Nature of use…..as a solvent in chemical reactions……………………………….

   Where used …..University laboratories……………..By whom used …..Academic and technical staff, students………..

4. EXPOSURE POTENTIAL

   Quantity used  <10mg  ☐ 10mg - 1g  ☐ 1g - 100g  ☑️ >100g  ☐

   Physical characteristics affecting exposure
   Non-volatile Liquid  ☐  Denser solid  ☩  Volatile Liquid  ☐  Highly volatile liquid  ☐

   Primary containment (excluding fume cupboard, etc)
   Closed system  ☐ Partially closed system  ☐ Open system  ☐

   Frequency of use
   Occasional  ☐ Frequent  ☐ Continuous  ☐

   OVERALL EXPOSURE POTENTIAL  Negligible  ☐ Low  ☐ Medium  ☑️ High

5. RISK ASSESSMENT

   Route(s) of contact: Skin ☑️ Eyes ☑️ Inhalation ☑️ Ingestion ☐ Other ☐ State:………………………………………………………………………..

   Assessment of risk to health: Negligible  ☐ Low  ☐ Medium  ☑️ High………………………………………………………………………..

6. PRECAUTIONS NECESSARY IN HANDLING AND USE

   Hand protection ☑️ variety: PVC or nitrile……………..Respiratory protection ☐ variety:……………………………..

   Eye and Face protection ☑️ variety:……..Safety spectacles… Specialist clothing ☑️ variety:… lab coat:……………………………..

   Other ☐ state:…avoid breathing vapour. Use in fume cupboard or closed apparatus whenever practicable…………………..

   …………………………………………………………………………………………………………………………Copy attached  ☐

   Special storage precautions…store in flammable solvent cupboard…………………..

   Disposal:…………..In non-chlorinated waste solvent bottle………………………………………………………………………..

7. EMERGENCY PROCEDURES In case of spillage: shut off sources of ignition. Absorb on sand or absorbent granules. Store in sealed containers for disposal by contractor. Wash site with detergent and water. Ventilate area …………..

   Other specified emergency procedures……………………………………………………………………………………………..

   First Aid  Standard ☑️ Non-standard ☐ State:……………………………………………………………………………………………..

8. INFORMATION, INSTRUCTION AND TRAINING  Source of information: MSDS ☑️ Other ☐ Sigma:…………………..

   Training required: General laboratory training ☑️ Other ☐………………………………………………………………………..

9. FINAL ASSESSMENT  Risk to health is:…

   Unlikely ☐ Significant but adequately controlled ☑️ Significant, and controls needed ☐ Unknown. Actions needed ☐

10. ACTIONS TO IMPLEMENT THIS ASSESSMENT……………………………..

   Are any of the following required? Monitoring of exposure ☐ Health surveillance ☐ Workplace air monitoring ☐

   Is a copy to be sent to the Safety Office? YES/NO. If yes, date sent …………..Review Date of this assessment …………..

11. DECLARATION. The above is to the best of my knowledge an accurate statement of hazards and foreseeable risks. The procedures and precautions described will adequately control exposure to substances hazardous to health.

   Name of authorised person:……..A.N.Other……………………………..Signature:…………………..Date:……………………………..

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