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# INTRODUCTION

1. must ensure that exposure to substances hazardous to health is either prevented or adequately controlled.
2. In order to comply with the Control of Substances Hazardous to Health (COSHH) Regulations must make an assessment of the health risks created in the workplace by hazardous substances and the measures that are needed to control these.
3. This procedure applies to all work materials hazardous to health USED BY . They include recognised hazard classifications such as toxic, harmful, corrosive, sensitiser, irritant, carcinogen, mutagen and toxic to reproduction. Biological hazards are classified according to their potential and ability to cause infection and harm.

# RESPONSIBILITIES

## Supervisors

1. Supervisors must ensure that COSHH assessments have been carried out for all work processes involving hazardous materials and that these are readily accessible at the workplace.
2. Supervisors must provide their staff, researchers and visitors with suitable information, instruction and training about:

* the nature of the substances they work with, or are exposed to, and the risks created by exposure to these substances
* the precautions they should take
* control measures, their purpose and how to use them
* how to use personal protective equipment and clothing provided
* emergency procedures.

1. Users must be informed of the findings of relevant COSHH assessments by the assessor including the results of any exposure monitoring and health surveillance.
2. Supervisors must ensure that those using chemicals are familiar with CUED safety procedures, particularly Laboratory, Chemical and Biological Safety and Waste Disposal.

# WHICH SUBSTANCES ARE HARMFUL?

* Dusty or fume-laden air can cause lung diseases, eg in welders, quarry workers
* or woodworkers.
* Metalworking fluids can grow bacteria and fungi which cause dermatitis and
* asthma.
* Flowers, bulbs, fruit and vegetables can cause dermatitis.
* Wet working, eg catering and cleaning, can cause dermatitis.
* Prolonged contact with wet cement in construction can lead to chemical burns
* and/or dermatitis.
* Benzene in crude oil can cause leukaemia.

1. Many other products or substances used at work can be harmful, such as paint, ink, glue, lubricant, detergent and beauty products.

# WORKING WITH SUBSTANCES HAZARDOUS TO HEALTH

1. III health caused by these substances used at work is preventable. Many substances can harm health but, used properly, they almost never do.
2. Substances can also have other dangerous properties. They may be flammable, for example solvent-based products may give off flammable vapour. Clouds of dust from everyday materials, such as wood dust or flour, can explode if ignited.

## Look at each substance

1. Which substances are involved? In what way are they harmful? You can find out by:

* checking information that came with the product, eg a safety data sheet;
* asking the supplier, sales representative and your trade association;
* looking in the trade press for health and safety information;
* checking on the Internet, eg HSE’s website pages for your trade.

## Think about the task

1. If the substance is harmful, how might workers be exposed? By:

* breathing in gases, fumes, mist or dust?
* contact with the skin?
* swallowing?
* contact with the eyes?
* skin puncture?

1. Bear these in mind when you look at the tasks.

## Exposure by breathing in

1. Once breathed in, some substances can attack the nose, throat or lungs while others get into the body through the lungs and harm other parts of the body, eg the liver.

## Exposure by skin contact

1. Some substances damage skin, while others pass through it and damage other parts of the body. Skin gets contaminated:

* by direct contact with the substance, eg if you touch it or dip your hands in it;
* by splashing;
* by substances landing on the skin, eg airborne dust;
* by contact with contaminated surfaces – this includes contact with contamination inside protective gloves.

## Exposure by swallowing

1. People transfer chemicals from their hands to their mouths by eating, smoking etc without washing first.

## Exposure to the eyes

1. Some vapours, gases and dusts are irritating to eyes. Caustic fluid splashes can damage eyesight permanently.

## Exposure by skin puncture

1. Risks from skin puncture such as butchery or needlestick injuries are rare, but can involve infections or very harmful substances, eg drugs.

# COSHH ASSESSMENT

## COSHH Assessment Form

1. To assess the risk from hazardous substances a COSHH Assessment Form must be completed which should include the following areas:

## Assessor and Supervisor information

1. The Assessor (the one writing the risk assessment) and the Supervisor should be properly identified. Contact details should be included for the Assessor.

## Location

1. Identify the room(s), building(s) and sites(s) where this the substance will be used.

## Procedure

1. Write a short description of the procedure or task. Include recipes for reagents, buffers, solvents etc. that contain more than one chemical.

## Chemical

1. Write the full chemical name as identified on the Material Safety Data Sheet (MSDS). Include CAS number if likely to be confused with other chemicals. If a commercial product, write commercial name followed by chemical constituents. If relevant to the hazard, list concentration of chemical (e,g. an acid may be corrosive, irritant or non-hazardous depending upon concentration).

## Hazard

1. Use the risk phrases from the MSDS e.g. Irritating to eyes, respiratory system and skin. Ecological information (e.g. toxic to aquatic organisms) need not be included but will inform your choice of disposal.

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## Storage

1. Certain substances may require particular storage because of flammability, incompatibility or other hazard. Incompatibilities are generally listed on the Hazard Data Sheet.

## Waste Disposal

1. The assessment must include the appropriate safe disposal of reagents after completion of a procedure.

## Emergency Procedures

1. Consider possible emergencies such as the dropping of stock bottles or concentrated solutions.

## First Aid

1. List relevant first aid procedures.

## Assessment Summary

1. Summarise the assessment, highlight any areas of concern and identify any groups at enhanced risk (e.g. exposure of new and expectant mothers to certain compounds).

## List any necessary additional measures required

1. If the risk to health and safety is assessed as high, the procedure must be suspended until additional measures are in place.

## Assessor

1. The assessor should have experience of the procedure being assessed and sign to confirm and agree to the results of the assessment.

## Hazard assessment

1. A COSHH assessment must identify the hazardous substances in the workplace. The hazard a substance presents is dependent upon the type of hazard (e.g. toxic, irritant, sensitiser etc.), the route of exposure (e.g. inhalation), the amount being used and its physical form.

## Hazard data sheet

1. Health and Safety information for substances used or held by can be found on the relevant Material Safety Data Sheet as issued by the supplier.

## Hazard group

1. For risk assessment purposes, hazardous substances can be placed into hazard groups corresponding to their assigned risk number(s) and its associated risk phrase(s). This will also indicate the route of exposure. Suggested hazard groups can be found below.

## Physical form

1. The physical form of a chemical will affect how likely it is to get into the air.

# WORKPLACE EXPOSURE LIMITS

1. Workplace Exposure Limits (WELs) are occupational exposure limits designed to help protect the health of workers. WELS are concentrations of hazardous substances in the air, averaged over a specified period of time referred to as a time-weighted average. Two time periods are used: long-term (8 hours) and short-term (15 minutes). Short-term exposure limits are designed to reduce effects such as eye irritation that may occur following exposure for a few minutes.

# CONTROL MEASURES

1. When controlling exposure to a hazardous substance consider whether:

* the process can be changed to eliminate the need for the substance,
* the substance can be replaced with a safer alternative,
* the substance can be used in a safer form e.g. pellets instead of powder, ready made buffers or gels etc.

1. If prevention is not reasonably practicable, you must adequately control exposure e.g. by one or more of the following:

* totally enclose the process (e.g. glove box),
* partially enclose the process (e.g. fume cupboard),
* improve general ventilation,
* use systems of work that minimize the chances of spillage etc.,
* reduce the number of persons exposed.

1. List all engineering measures appropriate for the control of exposure to the hazard. This should be indicated by the MSDS and the risk phrase (e.g. if toxic by inhalation then use in a fume cupboard). Fume cupboard, glove box, safety cabinet (for biological) and local exhaust ventilation are examples.
2. The nature of the hazard will influence the control measures required. For further advice and assistance contact M2 Safety.

## Fume cupboards and safety cabinets

* When reliance is placed upon local exhaust ventilation, fume cupboards and other equipment, it is essential that they are tested at least annually and test records are kept for a minimum of five years. Record testing frequency and by whom. Any control measures must be maintained in an efficient working order and work as intended. Reduced efficiency must be detected. All engineering controls should be visually checked at least once a week and be subject to preventative service procedures.
* Adverse results from periodic test of control measures will necessitate review of any existing assessment(s).

## Flammables and explosives (DSEAR)

1. The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) set out minimum requirements for the protection of workers from fire and explosion from dangerous substances and potentially explosive atmospheres.
2. DSEAR applies where there is present any substance or mixture of substances with the potential to create a risk from energetic (energy-releasing) events such as fire, explosions, thermal runaway from exothermic reactions etc. Such substances, known in DSEAR as dangerous substances, include:

* flammable substances
* oxidisers
* explosives
* petrol
* liquefied petroleum gas (LPG)
* paints and varnishes
* solvents
* certain types of dust that are explosive (e.g. wood dust)

1. The main requirements of DSEAR are that:

* an assessment is made of the fire and explosion risks of any work activities involving dangerous substances
* measures are undertaken to eliminate, or reduce as far as is reasonably practicable the identified fire and explosion risks
* residual risks are controlled in order to mitigate the detrimental effects of a fire or explosion
* equipment is provided and procedures put in place to deal with accidents and emergencies
* information and precautionary training given

1. Additionally, where explosive atmospheres may occur, signage should indicate the hazardous area and equipment within that area should satisfy The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996. Classification of a work area should be by a competent person (contact Safety Office).
2. For a DSEAR assessment contact M2 Safety.

# PERSONAL PROTECTIVE EQUIPMENT

1. Record type of protective equipment used. Personal protective equipment (PPE) should only be used where it is not practical or feasible to achieve adequate control by operational or engineering measures alone, in an emergency or for routine maintenance. PPE should comply with International, European or British Standards.
2. Eye protection would be indicated for most hazardous chemicals, a face shield or goggles for corrosives and chemicals with the risk phrase ‘risk of serious damage to eyes’.
3. Respiratory protection such as dust masks will require face-fit testing (contact M2 Safety).
4. Many chemicals can permeate glove materials (especially organic solvents). Check ‘breakthrough times’ published by manufacturers and suppliers.

# MONITORING

1. Where necessary, monitoring of the work place should be undertaken to ensure that exposure to hazardous substances is below permitted exposure limits. If the risk assessment has identified that these limits may be exceeded if control measures fail, then monitoring must be carried out e.g. low oxygen alarms in areas using liquid nitrogen or carbon monoxide alarms for combustion experiments.

# HEALTH SURVEILLANCE

1. For work involving:

* category 1 and 2 carcinogens, mutagens and substances toxic to reproduction
* respiratory or skin sensitisers
* pathogens or biological agents in Hazard Group 3 or above
* orgnophosphorus compounds
* cadmium or cadmium compounds (where exposure to vapour or dust is possible)
* burning lead (e.g. welding or soldering)
* free nanoparticles

1. Notification will be given to Occupational Health and those working with them should complete a health record and submit it to the Safety Office annually. These records must be kept by the Department for 40 years to comply with the COSHH Regulations.

# OUT OF HOURS/LONE WORKING

1. The consequences of accidental exposure will be greater if working alone or out of hours. Consider whether the procedure or parts of the procedure are appropriate for out of hours or lone working (see Out of Hours and/or Lone Working pages for further guidance). Note any enhanced control measures required for out of hours or lone working.

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