Iechyd a Diogelwch – Health and Safety

CHEMICAL SAFETY – SAFE HANDLING AND USE OF CHEMICALS

This Information Sheet provides guidance on using chemicals safely in order to protect both people and the environment. It should be read in conjunction with other supporting Information Sheets eg *'First Things First' and Identifying Chemical Hazards'* and *'Disposing of Chemical Wastes'*.

General Information

A wide variety of chemicals are used in teaching and research. Some chemicals are very hazardous and unless used properly can injure people and damage both the environment and property.

The Control of Substances Hazardous to Health (COSHH) Regulations 2002 exist to protect people from the effects of hazardous chemicals and biological agents. The Regulations require that before using any hazardous substance a COSHH Assessment is undertaken which will:

- Identify the risks associated with the hazardous substance.
- Identify appropriate controls to manage any risk.

Questions and Answers

Q. Do I need to do a COSHH Assessment for all chemicals?

A. *No. The COSHH Regulations only apply to chemicals and biological agents that can cause damage to human health.*

Q. What substances are covered by COSHH?

A.

- **Substances which are classed as toxic, very toxic, harmful, corrosive or irritant.**
- **Substances for which there is a Workplace Exposure Limit (WEL).**
- **Hazardous biological agents**
- **Dusts present above certain concentrations.**

For guidance on identifying chemical hazards see *Information Sheet 2 – Identifying Chemical Hazards.*

For guidance on biological hazards see *Information Sheet – Biological Hazards.*

Q. I want to work with a hazardous chemical covered by the COSHH Regulations what should I do?

A. If possible try and reduce the hazards associated with the chemical by applying the following:

- **ELIMINATE.** Don't use the hazardous chemical if a suitable alternative process is available eg preserve tissue samples by freezing rather than using hazardous chemicals.
- **REDUCE.** Use smaller amounts or a lower concentration eg use dilute acid rather than concentrated acid.
- **SUBSTITUTE.** Use a less hazardous chemical that performs the same function. Or use a less hazardous form of the chemical eg liquid rather than a powder.

Q. I can't eliminate the chemical there is no alternative? I have reduced the amounts used as far as possible what do I do now?

A. You need to identify the hazardous properties of the chemical in detail, find out how it may get into the body and the steps you need to take to protect yourself and other people from harm. Risk and Safety Phrases (found on MSDS sheets) tell you how a chemical can cause harm and how to protect yourself and others that may be at risk.

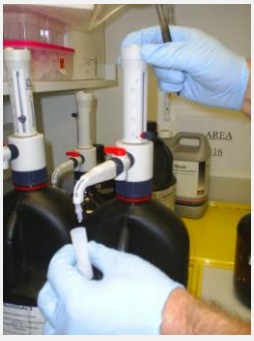
For example:

Risk Phrase	**Safety Phrase**
R23 – toxic by inhalation	• S22 – do not breathe dust • S23 – do not breathe gas / fumes / vapour / spray
R38 – irritating to skin	• S24 – avoid contact with skin • S37 – wear suitable gloves
R46 – may cause inheritable genetic damage R47 – may cause birth defects R60 – may impair fertility R61 – may cause harm to the unborn child R64 – may cause harm to breast fed babies	• See note below

NOTE: Always be aware that some individuals may be at greater risk when exposed to certain types of chemicals. For example, there are a variety of chemicals that pose little danger to males but which could cause serious harm to expectant and nursing mothers. When assessing the hazards associated with all chemicals you must consider everyone who may become exposed.

ALWAYS Refer to *OHSG13 – Code of Practice when Handling Hydrofluoric Acid.*

Once you have identified the risks associated with the chemical you must use appropriate control measures. For example:

Control Measure	**What is it suitable for?**
Fume hood 	Providing protection from chemicals or processes that produce hazardous gases / vapours / fumes / dusts that can cause damage when inhaled. Fume Hoods also provide a degree of protection when handling concentrated acids. The following acids can be handled outside a fume hood **PROVIDED**: • Suitable PPE is worn. • You are sure no hazardous gases, vapours, fumes will be produced during their use. • Their concentration is below: - Sulphuric, Nitric, Hydrochloric and Phosphoric Acids concentration is less than 50% of the concentrated acid in aqueous solution. - Acetic Acid is less than 10%.
Local exhaust ventilation systems 	Useful for controlling exposure to non toxic dusts.
Restricted areas 	Useful for keeping people away from areas where very hazardous chemicals such as carcinogens are used and for warning people that there may be something on the worktop that they can't see but that may cause them harm. Also useful for protecting nursing and expectant mothers from chemicals that may impair development.
Automated dispensers 	Useful for dispensing toxic or corrosive substances as they reduce the risk of spilling it on you. It also cuts down handling times.

Personal Protective Equipment (PPE)

PPE is always considered to be the last resort when controlling hazards because it only offers protection to the user and its effectiveness varies depending on many factors. For example:

- Type
- Fit
- Maintenance and cleaning
- Storage
- User training
- Personal factors eg latex allergies

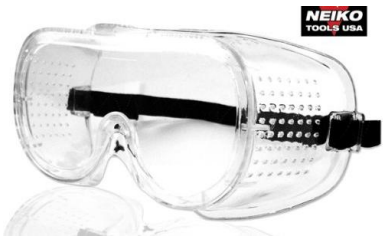
When selecting PPE people very often follow guidance given in the MSDS, however the information is often very generic and may not provide specific information to select the most suitable PPE. For example, the MSDS may specify eye protection and gloves but there are many different types and you need to select the correct ones:

- Hand Protection – **ALWAYS** wear appropriate PPE eg gloves and goggles (the following chart and the COSHH Assessment should help you). But remember, different thicknesses of gloves are needed dependent on what you are doing eg thicker gloves such as 'marigolds' will be needed if you are handling concentrated acids or bases.

Chemical group	Glove material					
	Natural rubber	Nitrile rubber	Neoprene/TM	PVC	Butyl	Viton/TM
Water miscible substances, weak acids/alkalis	✓	✓	✓	✓	-	-
Oils	-	✓	-	-	-	-
Chlorinated hydrocarbons	-	-	-	-	-	✓
Aromatic Solvents	-	-	-	-	-	✓
Aliphatic solvents	-	✓	-	-	-	✓
Strong acids	-	-	-	-	✓	-
Strong alkalis	-	-	✓	-	-	-
PCBs	-	-	-	-	-	✓

- Face and Eye Protection

Safety glasses. Do not give all round protection to the eyes



Safety goggles. Give all round protection to the eyes but may mist up, making vision difficult

Full face protection against chemical splashes. Care required to stop them getting scratched. Fit important to ensure protection

- Face Masks

Disposal dust mask. Offers some protection against nuisance dusts

Half mask respirator. Different filters can be used to protect against specific chemicals

Full mask respirator provides eye and lung protection. Different filters can be used to protect against specific chemicals

FINALLY:

Before undertaking any work with substances hazardous to health you must complete a COSHH Assessment. This involves documenting the hazards associated with the chemicals, the controls in place to protect yourself and others and contingency plans in the event something goes wrong. Further guidance on how to undertake a COSHH Assessment is available on the COSHH Assessment Powerpoint presentation.

In addition, Substances that can harm people as a result of fire and explosion are covered by the Dangerous Substances and Explosive Atmosphere (DSEAR) Regulations. A special risk assessment is required when using such chemicals. Please contact your College or Departmental Health and Safety Coordinator to discuss.