

# ADVISORY STANDARD 2003 FOR HAZARDOUS SUBSTANCES



# HAZARDOUS SUBSTANCES ADVISORY STANDARD 2003

## Important Information about this Standard

1. Replaces the Advisory Standard entitled **Hazardous Substances Advisory Standard 1998** (repealed to take effect at the end of 30 April 2003)
2. was made on 14 April 2003
3. commences on 1 May 2003
4. expires 5 years after its commencement

## What is this Standard about?

The purpose of the Hazardous Substances Advisory Standard is to give practical advice on ways to manage specific risks that arise when hazardous substances are used at workplaces.

## What is an advisory standard?

An advisory standard states ways to manage exposure to certain risks. If there is an advisory standard about a risk and you have an obligation to prevent exposure of persons to a risk, then you can meet your obligation by adopting and following advice in the relevant advisory standard. You may meet your obligations by choosing another way to that outlined in the advisory standard, providing it gives the same level of protection against the risk.

## Obligations and the Workplace Health and Safety Act 1995

The **Workplace Health and Safety Act 1995** (the Act) imposes workplace health and safety obligations on people at workplaces to ensure workplace health and safety. You may have more than one obligation under the Act.

Workplace health and safety is ensured when persons are free from risk of death, injury or illness created by workplace, workplace activities or specified high risk plant. Ensuring workplace health and safety involves identifying and managing exposure to the risks at your workplace.

## How can I meet my obligations?

Under the Act, there are three types of instruments made to help you meet your workplace health and safety obligations – regulations, advisory standards and industry codes of practice.

- If there is a regulation about a risk – you must do what the regulation says.
- If there is an advisory standard or industry code of practice about a risk, you must either – do what the standard or code says; or adopt another way that identifies and manages exposure to the risk.
- If there is no regulation, advisory standard or industry code of practice about a risk – you must choose any appropriate way and take reasonable precautions and exercise proper diligence to ensure you meet your obligations.

### **Information about this Advisory Standard**

The requirements of the **Workplace Health and Safety Regulation 1997** that relate to parts of this Advisory Standard are highlighted at the beginning of each Part.

Part 13 of the Regulation should be referred to for the specific detail of each provision.

The meaning of certain terms used in this Advisory Standard can be found in the Dictionary in Appendix 4.

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# 1. MATERIAL SAFETY DATA SHEETS (MSDS)

Part 13 (Hazardous Substances<sup>1</sup>) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of a **Supplier** to –

- provide a copy of a current MSDS to an employer or self-employed person; and
- provide a copy of an MSDS when requested by certain people.

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed person** to –

- obtain an MSDS of a hazardous substance<sup>2</sup> from the supplier;
- keep a register containing a list of all hazardous substances used at the workplace and put a copy of any MSDS obtained in the register;
- take reasonable steps to ensure the MSDS is not changed other than by the manufacturer or importer; and
- keep the MSDS close to where the substance is being used.

Many substances may present hazards at work. But if the hazards are known and understood, appropriate precautions can be taken so that they can be used safely. An MSDS will help a workplace to gather necessary information to safely manage the hazardous substance.

When new substances are to be introduced into the workplace, the employer should make arrangements to get a copy of the MSDS before the substance is brought into the workplace.

## 1.1 MSDS Detail

The following table should be used by a manufacturer or importer as a guide for the detail of information that should be provided on an MSDS. **Note: not all of the items listed in the detail of information will be relevant to all hazardous substances.**

Information Required	Detail of Information
Chemical and Physical Properties	Appearance Boiling Point/Melting Point (°C) Vapour Pressure Percent Volatile Specific Gravity Flash Point (°C) Flammability Limits (%) Solubility in Water Shock Sensitivity Corrosiveness Oxidising properties Reactivity with common substances eg air and water Autoignition temperature Evaporation rate Vapour density Odour threshold pH, at stated concentration Solubility in organic solvents Volatile organic compounds Bulk density Biodegradability Persistence in soil or water

- 1 For a manufacturer, importer or supplier a "hazardous substance" means –  
(a) a designated hazardous substance; or  
(b) a substance that is not a designated hazardous substance but meets approved criteria.  
Part 13 (Hazardous Substances) of the Regulation sets out what a hazardous substance does not include.
- 2 For an employer or self-employed person at a workplace a "hazardous substance" means a substance for which its supplier must (under the provisions of the Regulation) give an employer or self-employed person its current MSDS.

Information Required	Detail of Information
Health Hazards	<p>Health Effects for:</p> <p><b>Acute if:</b></p> <ul style="list-style-type: none"> <li>• Swallowed</li> <li>• Contact with eye</li> <li>• Contact with skin</li> <li>• Inhaled</li> </ul> <p><b>Chronic</b></p> <p>First Aid:</p> <p><b>Action if:</b></p> <ul style="list-style-type: none"> <li>• Swallowed</li> <li>• Contact with eye</li> <li>• Contact with skin</li> <li>• Inhaled</li> </ul> <p><b>First Aid Facilities</b></p> <p><b>Advice to Doctor</b></p> <p>Toxicity Data:</p> <ul style="list-style-type: none"> <li>• Animal toxicity</li> <li>• Ecotoxicity</li> </ul>
Safe Use	<p>Precautions for Use:</p> <ul style="list-style-type: none"> <li>• Exposure Standards</li> <li>• Engineering Controls</li> <li>• Personal Protection</li> <li>• Flammability</li> </ul> <p>Safe Handling:</p> <ul style="list-style-type: none"> <li>• Storage and transport</li> <li>• Spills and disposal</li> <li>• Fire/Explosion hazard</li> </ul>

In workplaces where a large proportion of the workers are non-English speaking, the MSDS may require translation into the relevant language(s).

## 1.2 Size and Terminology

An MSDS contains important information, so it should be written so that it can be easily understood by everyone. Headings should be logical and concise. The number of pages should be kept to a minimum.



### 1.3 Review of MSDS

To keep an MSDS current it should be reviewed whenever there is:

- a change in formulation which:
  - affects the hazardous properties of the substance,
  - alters the form or appearance of the substance, or
  - alters the mode of application of the substance;
- a change to the hazardous substance which alters its health and/or safety hazard or risk; and
- new health and/or safety information on the hazardous substance, for example, the exposure standard changes or a substance previously considered not harmful is now established to be carcinogenic.

## 2. LABELLING HAZARDOUS CONTAINERS

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of a **Supplier** to –

- fix a label to a hazardous substance's container.

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed person** to –

- ensure a label is fixed to a hazardous substance's container; and
- ensure warnings are given about enclosed systems containing hazardous substances.

### 2.1 Fixing Labels

The amount of information on a label will depend on the size of the container. However, where the container is so small that the label cannot be placed on the actual container, the label can be attached by other means, for example, by a string round the neck of a test tube.



## 2.2 Colour, Size and Style

Labels should be fixed to the container in colours that provide sufficient contrast to the background. Lettering should be of a size and style that is clearly legible and in the English language.



## 2.3 Revision of Labels

If an MSDS has been amended by the manufacturer, the label should be changed to ensure that it contains the same information as the amended MSDS.

## 2.4 Decanted Hazardous Substances

When a substance is decanted at work, the requirement for labelling will depend on whether the substance is used immediately or over a longer period of time.

Where a hazardous substance is decanted to be used straight away, the container into which the hazardous substance has been decanted does not require labelling only if the container has been cleaned of any residue.

The labels on the decanting containers should be used to provide information for the safe disposal of both the remaining hazardous substance and the container.

If the container into which the hazardous substance is decanted is small, it may not provide sufficient room for label information. In this case, the label should be attached to a supporting device or container. For example, in the case of a test tube, the label may be attached to the test tube rack. Alternatively, a tag with the required label information may also be used.

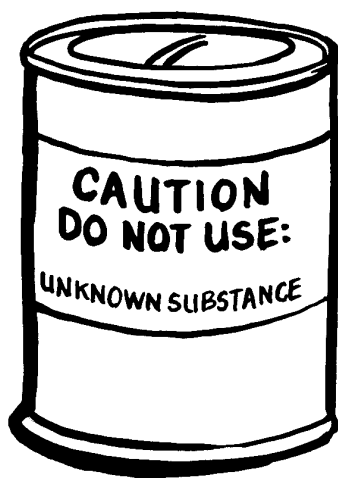
If a container label is damaged or defaced, a replacement copy should be obtained from the supplier. If the label cannot be obtained, the information on the MSDS should be used to produce a label for the container.



### 2.5 Unlabelled Containers / Unknown Substances

If the container is not labelled and the contents of the container not known, the container should be marked:

**"Caution do not use: unknown substance"**



A container of an unknown substance should be stored away from other substances where it cannot be used until its contents can be identified and the container appropriately labelled. If the contents cannot be identified, they should be disposed of following consultation with the relevant local Authority.

## 2.6 Hazardous Substances in Enclosed Systems

Enclosed systems such as piping, conduits and ducts should be marked by signs designed in accordance with appropriate standards<sup>3</sup>.

Colours, letters and symbols on the sign should enable everyone (not only workers but visitors such as emergency services personnel) to identify the contents easily.

## 2.7 Working in a Confined Space

Confined spaces potentially contain many hazards. These hazards can include:

- oxygen deficient atmospheres;
- toxic atmospheres;
- flammable or explosive atmospheres; and
- engulfment.

The **Workplace Health and Safety Regulation 1997** sets out the requirements when working in a confined space.

# 3. CONSULTATION

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed person** to –

- give a copy of a monitoring record result to a worker who may be exposed<sup>4</sup>;
- allow a worker to inspect the monitoring record at any reasonable time;
- allow a worker to inspect risk assessment records at any reasonable time; and
- allow a worker to who may be exposed to a hazardous substance at the workplace to inspect the MSDS register at any reasonable time.

## 3.1 Why Consult?

Consultation involves the sharing of information and exchange of views between employers, workers, workplace health and safety officers and workplace health and safety representatives. While the responsibility for health and safety decisions for the workplace rests with the employer, consultation provides an opportunity for workers to contribute to the decision making process. This will increase their commitment to any control measures implemented following the risk assessment. Consultation fosters co-operation in the workplace and may pre-empt or resolve problems relating to control of risks.

## 3.2 How to Consult

Consultation can happen in two ways:

- at an industry level through the Workplace Health and Safety Board and Industry Sector Standing Committees (see Part 6 of the Act); and
- at the workplace level through informal discussion with the workers, the election by workers of workplace health and safety representatives and by the establishment of workplace health and safety committees (see Part 7 of the Act).

3 Appropriate standards for managing hazardous substances in enclosed systems are provided in Appendix 2

4 A person is “exposed” to a hazardous substance if the person absorbs, or is likely to absorb, the substance –  
(a) by ingestion or inhalation; or  
(b) through the skin or mucous membrane.



### **3.3 What Consultation Should Cover**

The consultative process should cover the following:

- the introduction of new hazardous substances to the workplace;
- the identification of risks associated with hazardous substances at the workplace;
- the assessment of risks associated with hazardous substances at the workplace;
- decisions about the control measures to be implemented;
- induction and training requirements;
- advice to any workers with potential exposure to a particular hazardous substance;
- choosing a designated doctor for health surveillance; and
- the relocation of workers to suitable alternative work because of health surveillance results.

### **3.4 Equipment and Hazardous Substances**

Relevant information should be provided to workplace health and safety officers, workers and their workplace health and safety representatives on the equipment used with a hazardous substance, for example exhaust ventilation systems. The following information should be available:

- the use for which the equipment is designed;
- the conditions necessary for its safe use; and
- results of relevant tests which may have been carried out in connection with the safe operation of the equipment.

### **3.5 Workplace Health and Safety Representatives**

To assist the consultative process, workplace health and safety representatives should have ready access to:

- the results of monitoring, if any; and
- the results of health surveillance programs, if any, provided that medical confidentiality is maintained.

### 3.6 Providing Access to an MSDS for Workers

Depending on the needs of your workplace, access to an MSDS may be provided in several ways, including:

- paper copy collections of MSDSs;
- microfiche copy collections of MSDSs with microfiche readers open to use by all workers;
- computerised MSDS databases; and
- Internet databases.

Any storage or retrieval equipment used to provide access to an MSDS should be kept in good working order. Where information is displayed on a screen, there should be a means of obtaining a paper copy of that information.

### 3.7 Hazardous Substances Register

The register should be used as an information tool for consultation regarding the management of hazardous substances at the workplace.



## 4. TRAINING

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed person** to –

- give a worker who may be exposed to a hazardous substance induction and ongoing training about the substance having regard to the level of risk identified in the risk assessment and the workers who may be exposed to the substance; and
- keep a record of the induction and training for 5 years stating the date of the session, the topics dealt with, the name of the person who conducted the session, and the names of the workers who attended.

## 4.1 Using Risk Assessment Results

The results of risk assessments should be used to identify trainees, and to identify, choose, and evaluate training methods.

### 4.2 STEP 1: Identify who should be trained

People who should be trained include:

- workers who may be exposed to a hazardous substance at work;
- supervisors of workers at risk from exposure to a hazardous substance;
- workplace health and safety committee members and workplace health and safety representative(s);
- workers responsible for the purchasing of hazardous substances, control equipment, personal protective equipment and for the designing, scheduling, organisation and layout of work; and
- those who have direct involvement in fire or other emergency action.

### 4.3 STEP 2: Identify what training is needed

**Decide what competencies are needed**

The following table lists the topics in which persons using hazardous substances should be trained and the competencies they should attain:

TOPIC	COMPETENCIES
Legislative requirements	<p><b>Supervisors, Workplace Health and Safety Officers, Workplace Health and Safety Representatives</b> should be able to demonstrate an understanding of the following –</p> <ul style="list-style-type: none"><li>• obligations of employers, workers and others under the <b>Workplace Health and Safety Act 1995</b>;</li><li>• requirements of the <b>Workplace Health and Safety Regulation 1997</b>;</li><li>• responsibilities of manufacturers, importers, suppliers, employers and self-employed persons under the hazardous substances provisions of the <b>Workplace Health and Safety Regulation 1997</b>;</li><li>• the requirements for health surveillance, its purpose and the necessary procedures;</li><li>• provisions for the supply of an MSDS and labels to the workplace;</li><li>• requirements for hazardous substances registers and the access by workers to these.</li></ul> <p><b>Workers</b> should be able to demonstrate an understanding of the following –</p> <ul style="list-style-type: none"><li>• the general obligations of employers, workers and others under the <b>Workplace Health and Safety Act 1995</b>;</li><li>• the purpose and basic requirements for health surveillance.</li></ul>

TOPIC	COMPETENCIES
Information on hazardous substances	<p>The person being trained should be able to –</p> <ul style="list-style-type: none"> <li>• recognise and interpret information on an MSDS and label for a hazardous substance including: <ul style="list-style-type: none"> <li>– safety directions; and</li> <li>– Poison Scheduling<sup>5</sup> and Dangerous Goods classifications<sup>6</sup>;</li> <li>– first aid and emergency procedures, and special directions;</li> </ul> </li> <li>• Demonstrate an understanding of the importance of being able to: <ul style="list-style-type: none"> <li>– know the different parts of an MSDS and label and the significance of the information in each part;</li> <li>– extract and interpret information from an MSDS and product label;</li> <li>– relate the hazardous substance to the Poisons Schedule and Dangerous Goods classification;</li> </ul> </li> <li>• demonstrate ability to use the register and access the MSDS;</li> <li>• demonstrate an understanding of any work practice or procedure to be followed in any aspect of the use of a hazardous substance at a workplace; and</li> <li>• demonstrate an understanding of any control measure to be used in the workplace, including any information required for the correct use and maintenance of a control measure.</li> </ul>
Personal safety	<p>The person being trained should be able to demonstrate an understanding of –</p> <ul style="list-style-type: none"> <li>• the routes of entry into the body of a hazardous substance and ways of limiting exposure;</li> <li>• the risks presented by any hazardous substances commonly used in the particular industry;</li> <li>• methods used to control the risks created by a hazardous substance;</li> <li>• the precautions to be taken for a particular task, especially in respect of protective equipment and clothing, and the value in working with any other person when very toxic substances are handled; and</li> <li>• the correct use, fit and maintenance of protective equipment and clothing, in addition to any special decontamination procedures to be followed by persons required to use personal protective equipment.</li> </ul>
Emergency procedures	<p>The person being trained should be able to demonstrate an understanding of –</p> <ul style="list-style-type: none"> <li>• procedures to be followed in case of an emergency involving a hazardous substance; and</li> <li>• first aid or incident reporting procedures to be followed in case of an injury or illness.</li> </ul>

#### Determine the training needed for the workplace

The extent of a training program and the amount of detail required will depend on:

- the hazards associated with a substance used in the workplace;
- the complexity of the work procedures; and
- any controls, work practices and personal protective equipment required to minimise risks.

Determine those workers who already have the desired competencies. Design and present training to address the competencies that persons are not yet able to demonstrate.

<sup>5</sup> For information on poisons scheduling refer to the **Health (Drugs and Poisons) Regulation 1996 (QLD)** and the **Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP)** prepared by the Therapeutic Goods Administration and published by the Commonwealth.

<sup>6</sup> Dangerous goods' classifications are set out in the Australian Dangerous Goods Code published by the Commonwealth and the **Dangerous Goods Safety Management Act 2001** and the **Dangerous Goods Safety Management Regulation 2001 (QLD)**.

#### 4.4 STEP 3: Determine the method of training

##### Types of training

There are two types of training that should be provided:

- **Induction training** – the initial training given to workers when they commence employment. This training is of a generalised nature and may involve a workplace tour, conditions of employment, administration, organisational structure and function, emergency procedures and workplace amenities; and
- **On-going training** – the training given to workers throughout their employment. This training should be relevant to the exposure the worker has to hazardous substances used in the workplace.

##### Forms of training

The forms training can take are:

- **Formal training** – addresses specific needs of the workplace or workers and may be of a theoretical nature. Issues may cover legislative requirements, relevant information about hazardous substance, use of personal protective equipment and emergency procedures; and



- **On-the-job training** – covers supervised training received while actually doing the job. This form of training should be used to introduce a new/redesigned process or hazardous substance into the workplace and the precautions for its use.

In some cases, formal training will be required, in others, on-the-job training may be more appropriate. The focus of training should be on workers gaining and demonstrating the desired competencies.



### **Special Needs**

Any special needs of workers should be taken into account in deciding on the structure, content and delivery of training. These special needs may include literacy levels, work experience and specific skills required for the job.

### **Design of training program**

Training programs should be designed to:

- draw on workers' knowledge and experience;
- take into account literacy levels and any language barriers. For example, if the literacy level is low, then spoken or highly graphic visual methods should be used. If workers are from non-English speaking backgrounds, then the training should be provided in languages that they understand; and
- be practical and include a hands-on component, for example, the use and fitting of personal protective equipment for routine and emergency procedures.

## **4.5 STEP 4: Evaluate the training program**

### **Assess effectiveness of the training**

Training should be assessed by observation or measuring against the competencies in real or simulated conditions or where that is not possible by oral and/or written examination.

If persons undertaking the training are unable to demonstrate attainment of the required competencies, a review should be undertaken to establish if:

- sufficient detail on the topics was provided to enable attainment of the competencies;
- the form of training was appropriate, for example, fitting personal protective equipment during training session; and
- the training was delivered in a way that would ensure greatest understanding of the topics covered, for example language and literacy considerations.

### **Validate competencies over time**

Competencies should be validated over time to check that a person assessed as competent in previous training is still competent in his/her current job. The results of the validation process should be used to determine how often the training should be given or repeated.

### **Review training program**

The overall training program, including induction and ongoing training should be reviewed to ensure the topics and competencies required are applicable to the work being carried out by the person being trained:

- at least once a year; or
- each time there is a change in:
  - information provided on an MSDS;
  - any hazard information available;
  - a work practice;
  - a control measure; and
- each time a worker is assigned to:
  - a new task; or
  - a new work area.

## 5. MANAGING RISKS FROM HAZARDOUS SUBSTANCES

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed Person** to –

- assess the risk to health from a hazardous substance that is used, or is to be used, at the workplace –
  - as soon as practicable after it is used; and
  - within 5 years after the last assessment; and
  - when certain things happen at the workplace;
- include certain things in the assessment;
- record certain information about the assessment;
- keep the risk assessment record, monitoring result and health surveillance report for 30 years if the risk assessment shows use of a hazardous substance causes a significant degree of risk to health;
- keep the risk assessment record for 5 years if the risk assessment shows use of a hazardous substance does not cause a significant degree of risk to health;
- control exposure to a hazardous substance by preventing exposure, or if not practicable, reduce exposure to as low a level as is practicable, but in any case ensure exposure is not more than the relevant national exposure standard for the relevant period for the substance;
- provide personal protective equipment, properly instruct in its use, ensure it is used if it is not practicable to prevent or reduce exposure by other ways;
- ensure control measures decided are implemented as soon as practicable and ensure monitoring is done if the risk assessment shows it is needed;
- ensure a prohibited substance<sup>7</sup> is not used for a prohibited purpose;
- keep a register that has –
  - a list of all hazardous substances used at the workplace; and
  - the current MSDS for each hazardous substance; and
- ensure a worker who may be exposed to a hazardous substance at a workplace must be able to inspect the register at any reasonable time.

### 5.1 Risk Management

#### Managing hazardous substances in the workplace

The following issues should be considered when hazardous substances are used in the workplace:

- how hazardous substances should be used;
- how persons are exposed to hazardous substances;
- whether the risk from the hazardous substance is significant; and
- how exposure to hazardous substances in the workplace should be controlled.

#### Defining the terms “Hazard” and “Risk”

A **Hazard** is the potential for a substance to adversely affect the health and safety of people in the workplace.

A **Risk** is the likelihood that a substance will cause illness or injury in the conditions of its use. The risk to health and safety usually increases with the severity of the hazard, the amount of hazardous substance used, and the duration and frequency of exposure.

<sup>7</sup> Prohibited substances are contained in Schedule 7 (Prohibited Substances) of the **Workplace Health and Safety Regulation 1997**.

For example, the solvent Xylene has been identified through tests on animals and humans as being a hazard to humans. The risk to a worker using Xylene will depend on the way it is used. If it is used in an enclosed system the risk will be low. However, if it is used in a degreasing bath without ventilation, the risk to health from inhaling the vapour is likely to be high.

## 5.2 Managing Risk – A 10 Step Plan

A 10-step plan outlined in the Advisory Standard should be followed to:

- identify hazardous substances used in the workplace;
- assess the risk from their use;
- determine and implement appropriate control measures so that they can be handled and used safely; and
- review and monitor the effectiveness of control measures used.

Management of risks from hazardous substances should be applied wherever the work is being carried out, for example the different locations where cleaners are carrying out cleaning work while using hazardous substances.

## 5.3 Assessing Risk

An assessment is the examination of ways in which a hazardous substance is used at work and the health risks involved. The purpose of the assessment is to enable decisions to be made about appropriate control measures, training, monitoring and health surveillance. These decisions will depend on the risk that arises from the use of a hazardous substance under particular working conditions.

### Types of Assessments

The way in which an assessment is conducted depends on the circumstances of the workplace. Two possible methods are:

- **Workplace specific assessment** – An example could be a walk-through survey of the workplace using a checklist. The checklist should be based on information on labels and MSDSs, for example, risk phrases on labels could be used to get an idea of how a person using a substance may be exposed.

In some cases, considerably more detail will be required, particularly where:

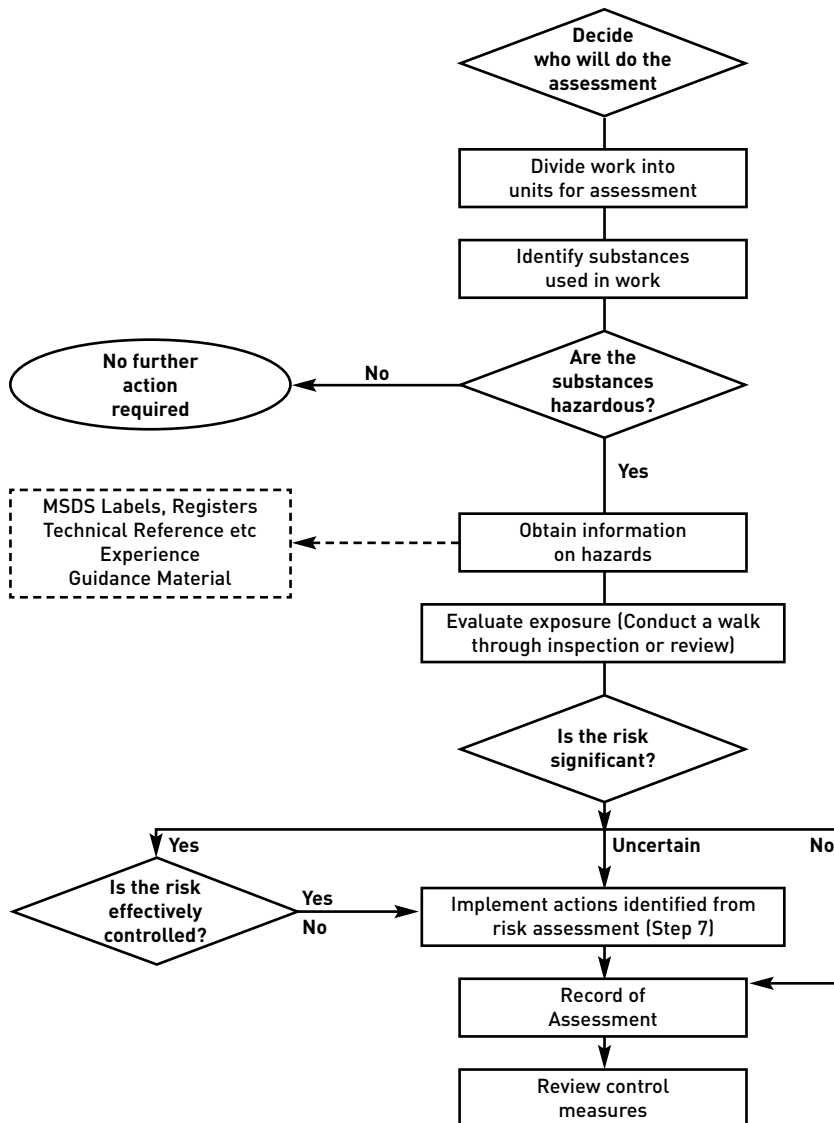
- a significant risk to health is suspected; or
- there is uncertainty about the degree of risk; or
- there are complex chemical processes and/or exposures involved.

In these cases, additional detail on all facets of the assessment may be required. This could include the use of outside professional assistance.

- **Generic assessments** – An example of a generic assessment may be in the use of hazardous substances at service stations. In this case, the nature of the hazard and the degree of risk at one service station may be comparable to the degree of risk at others. Therefore, a single assessment of the activity can be applied to other workplaces where the use for the hazardous substance is the same.

When a generic assessment is undertaken it should be checked for validity at each individual workplace.

## OVERVIEW OF THE PROCESS FOR THE ASSESSMENT OF HEALTH RISKS ARISING FROM THE USE OF HAZARDOUS SUBSTANCES AT A WORKPLACE



### Factors in a Risk Assessment

The purpose of a risk assessment is to allow appropriate control measures to be developed. Once hazards have been identified, they should be assessed in terms of their potential to do harm.

All the factors in risk assessment are interconnected. For the purposes of performing an assessment, the employer should consider the factors in isolation and then consider their combined effect. The factors are:

- the risk associated with the hazard (for example, substances are inhaled, get on skin or in eyes);
- the probability that an event or an exposure will occur;
- the length of time of exposure a person has to the hazard (ranging from occasional to continuous contact with the hazard); and
- the possible consequences that may result, for example, causing liver disease, cancer and burns.

### STEP 1: Decide who will do the risk assessment

In a small business, assessments are usually undertaken by an employer or manager, in cooperation with the workers. The tasks needed to carry out an assessment may be delegated by the employer to other persons at the workplace. However, the overriding responsibility for the accuracy and appropriateness of the assessment is held by the employer.

Professional persons from outside the workplace may provide assistance for elements of the assessment which require special expertise. In a large workplace it might be useful to establish a team, for example, the relevant manager/supervisor, workplace health and safety officer and workplace health and safety representative to assess particular work.



The person who conducts the assessment (the assessor) should have sufficient knowledge and skills to evaluate the health risks to workers arising from the use of a hazardous substance. They should understand the requirements of the **Workplace Health and Safety Act 1995**, relevant regulatory provisions and advisory standards and have a sound knowledge of the work activity.

Where an outside consultant is engaged to assist with the assessment, workers who have a thorough knowledge of the work should always be involved. The assessor should have the authority to do the work necessary for the assessment, and enough resources to gather information, consult the appropriate workers, review existing records and examine the workplace.

The assessor should also be able to:

- interpret the information on an MSDS and labels;
- observe the conditions of work and foresee potential problems;
- communicate effectively with everyone at the workplace;
- draw all the information together in a systematic way to form valid conclusions about exposures and risks; and
- report the findings accurately to all parties concerned.

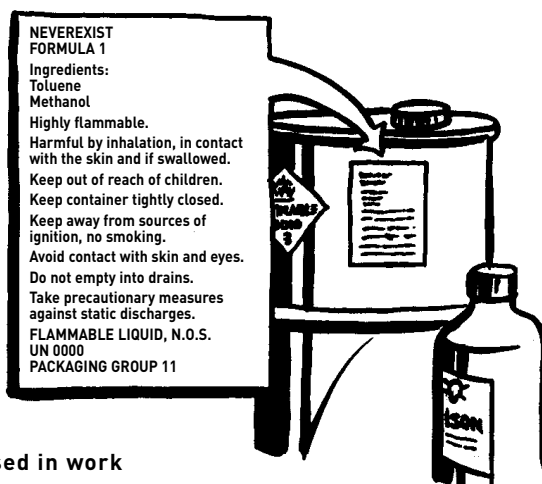
The employer should be aware of any limitations in the experience and knowledge of the personnel doing a risk assessment. In such instances it may be necessary to supplement this knowledge by arranging appropriate training in risk assessment or engaging specialist assistance.



If a team approach is used, members of the assessment team might be assigned different tasks. Individual findings should be communicated to the person selected to coordinate the assessment. This person should reach appropriate conclusions about risks and determine control measures. In larger workplaces where many assessments are needed, an overview committee may be established to coordinate the assessments.

## STEP 2: Divide the work into units for assessment

To make the risk assessment easier, the work that utilises a hazardous substance should be divided into jobs, tasks or processes. Visiting the workplace and looking at floor plans or process plans should help with this. Dividing a small workplace in this way may not be necessary when only a few substances and persons are involved.



## STEP 3: Identify substances used in work

The next step is to identify whether or not there are hazardous substances used in the workplace. When identifying a hazardous substance used or intended to be used, in the workplace, it is important to recognise that it could exist in various states or forms – solid, liquid, gas, vapour, dust, mist or fume.



Substances used in the workplace should be identified by:

- referring to stock lists, inventories and registers;
- checking all locations where substances are used or stored; and
- considering all substances that are used in, or that arise from, ancillary work such as maintenance and repair, cleaning, research or testing.

#### **STEP 4: Determine if the substances are hazardous substances**

From the information collected in Step 3 refer to the MSDS and labels for information on whether the substance is hazardous.

All hazardous substances that have been identified must be included in the hazardous substances register along with a copy of the MSDS. (See Section 1 for information on Material Safety Data Sheets)

**Note:** If you are unsure if the substance is a hazardous substance contact the supplier.

#### **STEP 5: Obtain information about hazardous substances**

Information should be obtained about the hazardous substances in the workplace, routes of exposure, recommended control measures and other action to prevent or minimise risks. For most risk assessments, container labels and MSDSs will provide this information. Where the nature of the hazard is very serious, or chemical processes are complex, it may be necessary to obtain more detailed information from other sources, for example, from the manufacturer or supplier of the substance, a designated doctor or an occupational hygienist.

#### **STEP 6: Inspect workplace and evaluate exposure**

A “walk-through” inspection should provide information about hazardous substances used in each work area. In assessing existing processes, it is important to talk to workers in each area regarding practical information about work practices and procedures. For example, workers could describe what happens during a breakdown, maintenance, changes in personnel or volume of production, weather conditions or other changes that can affect the ways hazardous substances are handled and used.

If a job, process or other work unit is being planned, an evaluation of the relevant work process, plan or design should be undertaken before the commencement of the operation. This will enable any hazards inherent in each step of the process and consequent risks to be identified. Suitable control measures can then be determined. For example, a metal shop proposes to introduce electroplating, which will result in new chemicals being used in the workplace. Therefore it will be necessary to implement different measures to control the exposure of workers on the electroplating line.

**The following questions should be answered when inspecting and evaluating exposure:**

**(a) Is the hazardous substance released or emitted into the work area?**

In determining whether a hazardous substance is released or emitted into a work area, the following should be considered:

- evidence of contamination, that is dust or fumes visible in the air or on surfaces, substance visible on a person’s skin or clothing, odour of substance, visible leaks, spills or residues. **Note: the use of odour should be used with caution as it is not necessarily an indicator of the levels permitted by Regulation;**
- handling substances, for example, powders not in containers;
- chemical splashes; and
- workers’ experience or symptoms of exposure.

If the hazardous substance is not released or emitted into the work area, go on to Step 7.



**(b) Are workers exposed to the hazardous substance through inhalation, ingestion, skin or eye contact, or is there a possibility of accidental injection into the body?**

It is important to identify the types of exposure which might affect workers. Workers involved in production, repairs, maintenance, cleaning or office work may all face different types of exposure. Also consider contractors on site and people who might be exposed in an emergency such as a chemical spill, leak or fire.

People may be exposed by:

- working directly with the hazardous substance;
- working near or passing through areas in which the hazardous substance is stored, transported, disposed of, or produced by discharge of emissions, e.g. exhaust;
- entering a confined space in which the hazardous substance might be present; or
- cleaning, performing maintenance or other work in areas where the hazardous substance might be present.

**(c) How much are workers and other persons exposed to hazardous substances and for how long?**

It is important to identify the amount of hazardous substances to which workers are exposed and the length of time over which exposure occurs. In particular, remember that exposure standards for hazardous substances are calculated on a daily 8 hour exposure. Where workers have been exposed in excess of 8 hours during their working day specialist help may be needed to apply the exposure standard.

In identifying how much and for how long, ask:

- What degree of exposure is expected?
- Does exposure occur intermittently or continuously?
- Does exposure occur frequently?
- What are the different routes of exposure?
- How many workers are exposed?

If monitoring is required it should be carried out by a person who has sufficient knowledge, skills and experience in the techniques and procedures listed below:

- when and how the monitoring is to be done;
- the sampling procedures and analytical methods to be used;
- the sites and frequency of sampling; and
- how the results are to be interpreted.

Section 7 of this Advisory Standard provides more information on monitoring and Appendix 1 lists publications which provide advice on suitable sampling techniques and methods of analysis.

Monitoring records should contain the following information:

- the hazardous substance concerned, the results of monitoring and when it was done;
- what monitoring procedures were adopted, including the duration of sampling;
- the locations where samples were taken, the operations in progress at the time and, in the case of personal samples, the names of those individuals concerned;
- whether the results reflected normal operating conditions;
- who undertook the analysis of the results;
- how the results were interpreted; and
- the effectiveness of control measures.

**(d) What control measures are used or proposed? Are the existing control measures effective, properly used and maintained?**

During a walk-through inspection, the following points should be considered:

- are any engineering controls in place, such as, isolation or enclosure of processes?
- are effective general ventilation and local exhaust ventilation systems in place effective and adequately maintained?
- are workers trained in the proper use and maintenance of control measures?
- do work practices ensure safe handling?
- are appropriate personal protective clothing and equipment used and maintained in a clean and effective condition?
- are facilities for changing, washing and eating meals maintained in good condition? Good personal hygiene practices can help reduce worker exposure to a hazardous substance.
- are good housekeeping practices in place?
- are all hazardous substances stored correctly?
- is disposal of waste appropriate?
- are appropriate emergency procedures and equipment in place (for example, eye wash, safety shower, etc)?

**(e) Are there any risks associated with the storage and handling of the hazardous substance?**

The risk associated with the storage and handling of a hazardous substance in the workplace often relates to spillage and fire. Under these circumstances, workers might be exposed briefly but at high concentrations, i.e. the exposure is acute. As a result, the hazardous substance may also be classified as dangerous goods. These risks are different from those associated with day-to-day exposure, and should be considered separately.

Stated dangerous goods should not be confused with hazardous substances – they are classified according to different criteria. Dangerous goods are classified on the basis of immediate physical or chemical effects, such as fire explosion, corrosion and poisoning, the effect on property, the environment or people, while hazardous substances are classified only in the basis of health effects (whether they be immediate or long term).

The **Dangerous Goods Safety Management Act 2001** and the **Dangerous Goods Safety Management Regulation 2001** set out the requirements for the storage and handling of dangerous goods at workplaces and other locations.

**Note: The Australian Dangerous Goods Code** sets out the technical requirements for the transport of dangerous goods.

**STEP 7: Evaluate the risk and determine conclusions about the risk**

The conclusions at Step 6 will provide the necessary information to establish:

- the nature and severity of the hazard for each hazardous substance;
- the degree of exposure of persons in the workplace; and
- whether existing control measures adequately control exposure.

**Conclusions from the risk assessment**

It should now be possible to establish which of the following conclusions apply to the assessment and what action is required.

**Conclusion 1: Risks NOT SIGNIFICANT now and not likely to increase in the future**

This conclusion applies where it is unlikely that the use of the hazardous substance will adversely affect the health of persons at the workplace and the risk is not likely to increase in the future.

For example:

- the amounts or rate of use of a hazardous substance are too small to constitute a risk, even if controls fail;
- the operation obviously and strictly conforms to the information contained in the MSDS and label;
- similar assessments in the past have confirmed the risks were not significant, and work conditions now are the same.

**Action required:**

End current assessment and go to Step 9.

“Significant risk” – means that the work with a hazardous substance is likely to adversely affect the health of workers and other persons at the workplace. For example, there would be a “significant risk” if:

- the severity of the acute<sup>8</sup> or chronic<sup>9</sup> health effects from exposure to the hazardous substance are substantial; or
- there are no control measures in place at the workplace or the controls that are in place are not adequate to protect workers from exposure to a hazardous substance; or
- the level of exposure is high.

Consultation should take place to decide if the risk is significant. If the contaminant concentration in a person’s breathing zone is above half the national exposure standard, a plan should be developed to review the levels before the next assessment. Further action in reviewing the exposure will assist in ensuring that the concentration does not reach a level which poses a significant risk to health and safety.

**Conclusion 2: Risks are SIGNIFICANT but effectively controlled, and could increase in the future**

This conclusion usually applies to conditions where serious health effects could result if the control measures fail or deteriorate. This usually results from the use of a highly toxic hazardous substance or where the potential exposure is high.

Risks, while presently adequately controlled, could increase in the future, owing to, for example:

- undetected deterioration in the efficiency of control measures;
- plant including PPE or system failure;
- control measures not used properly;
- human error from lack of awareness;
- ineffective monitoring;
- insufficient or lack of ongoing training;
- changes in methods or rate of work; and
- a significant increase in the quantity of hazardous substances used.

8 Acute effects occur immediately or soon after exposure, for example, poisoning with carbon monoxide from a petrol engine

9 Chronic effects are slow to occur and may take months or many years to show up, for example, silicosis – lung disease from silica dust

**Action required:**

- determine precautions to maintain controls and minimise chances of higher exposure occurring;
- determine additional measures for regaining control if a high risk event occurs, despite precautions (see Step 8); and
- determine if monitoring or health surveillance is required to check on effectiveness of controls (see Step 8).

**Conclusion 3: Risks SIGNIFICANT now, and not effectively controlled**

The following indicates where the use of a hazardous substance is likely to constitute a risk and further investigation may be necessary if:

- dusts, mists or fumes are visible in the air, for example in light beams, and there are persistent or widespread complaints of illness, discomfort, irritation or excessive odour;
- hazardous substances are splashed;
- control measures are broken, defective or badly maintained, for example a poorly maintained extraction system which no longer draws a hazardous substance away from the work area;
- recognised safe work practices are not being observed;
- airborne concentrations approach or exceed exposure standards;
- ill-health associated with exposure has been detected by health surveillance; and
- results of biological monitoring indicates workers are at risk.

**Action required:**

Identify and implement immediate measures for preventing or controlling exposure (see Step 8);

- work out if there is a need to stop the process;
- begin review of longer term control requirements;
- re-evaluate exposures when the upgraded control measures are in place; and
- determine if monitoring or health surveillance is required (see Step 8).

**Conclusion 4: Uncertain about risks: not enough information, or uncertain about degree and extent of exposure**

If the level of exposure cannot be estimated with confidence, further investigation is necessary. Atmospheric monitoring might be required to estimate the level of exposure. For a hazardous substance absorbed through the skin, ingested or inhaled, biological monitoring might be required. A detailed evaluation might be needed if there is the potential for a major hazard such as a large leak or spill. In these cases, relevant specialist advice would probably be required.

If there is not enough information to estimate the risks, additional information should be obtained from other sources, such as suppliers, occupational health and safety consultants and industry or trade associations.

**Action required:**

- obtain additional information or conduct a more detailed assessment. The employer should obtain specialist advice if necessary and continue until he/she is able to arrive at Conclusion 1, 2 or 3 and then take the appropriate actions; and
- meanwhile, implement good work practices to minimise exposure.

## 5.4 Controlling the risks

### **STEP 8: Implement control measures to address actions required from risk management**

Control or prevention of exposure is undertaken by implementing appropriate control measures. When considering methods to control exposure, all the possible routes of entry to the body should be taken into account.

Control measures are not mutually exclusive and in some circumstances two or more control measures may be required to reduce exposure to as low a level as is practicable.

Control measures for a hazardous substance should be considered in the planning of any new workplace or modifications to an existing workplace. The costs of the control should be considered in the same way and at the same time as all other plant and process costs.

#### **Hierarchy of Control Measures**

The hierarchy of control measures is a list of control measures, in priority order, that can be used to eliminate or minimise exposure to a hazardous substance. The order in which control measures should be implemented is:

- Elimination
- Substitution
- Isolation
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment (PPE).

Application of the hierarchy of control measures involves firstly assessing whether a hazardous substance can be eliminated. Where this is not practicable, substitution should be considered. If this is not practicable, consideration should be given to each of the other control measures (isolation, engineering controls, safe work practices and use of personal protection equipment) in turn, with the objective of identifying a control measure or combination of control measures, that will eliminate or minimise exposure.

#### **Control Measures**

**Elimination** – where a work activity involves the use of a hazardous substance that is not essential to the work activity the hazardous substance should be eliminated, wherever practicable. Examples of elimination include:

- using a physical process rather than a chemical process to clean an object, for example, use of ultra-sound;
- using clips, clamps or bolts instead of adhesive; and
- purchasing supplies of a material in a ready-cut and sized form rather than carrying out a dust producing cutting process on site.

**Substitution** – includes substituting a less hazardous substance, the same substance in a less hazardous form or the same substance in a less hazardous process. Examples of substitution include:

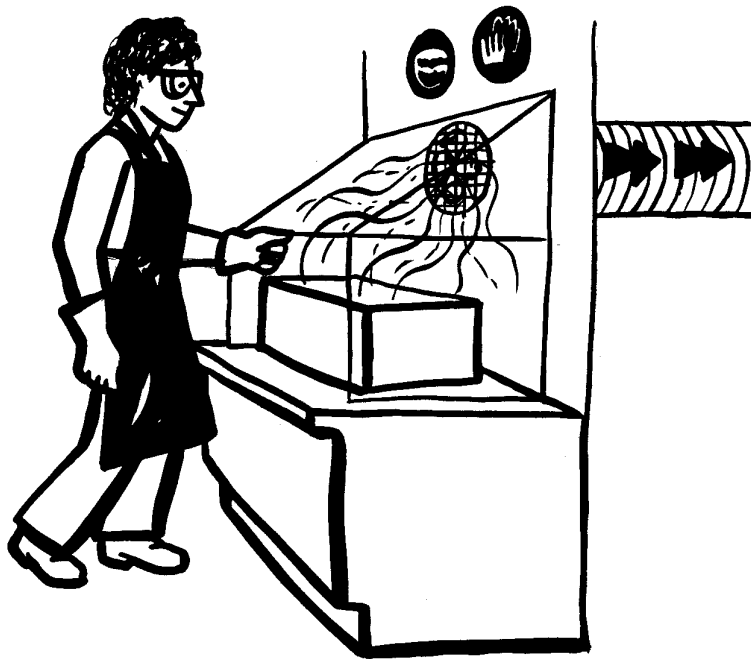
- replacing a chlorinated degreasing solvent with a detergent;
- using a water-based paint in place of an organic solvent-based paint;
- using a hazardous substance in paste or pellet form rather than a dusty powder; and
- brush application of paint rather than aerosol application.

**Isolation** – involves separation of the process from people by distance or the use of barriers to prevent exposure. For example, a booth in an underground carpark is supplied with fresh air to minimise carbon monoxide exposure for a parking attendant.

**Engineering Controls** – by the use of plant or processes which minimise the generation of a hazardous substance, suppress or contain a hazardous substance or which limit the area of contamination in the event of spills or leaks.

Types of engineering controls include enclosure or partial enclosure, local exhaust ventilation and automation of processes. Some examples of engineering controls are:

- ventilated booths for spraying paint or fibre glassing;
- robot welding;
- local extraction systems attached to grinding machines;
- automation of the removal of objects from degreasing baths; and
- closed reaction vessels.



**Administrative Controls** – are work practices which require people to work in safer ways and are intended to limit the extent of exposure to a hazardous substance. Examples of safe work practices include:

- excluding non essential persons from a work area;
- shift or work rotation to reduce the period of exposure for workers;
- regular cleaning of contamination from walls and surfaces;
- providing means for safe storage and disposal of a hazardous substance;
- prohibiting eating, drinking and smoking in contaminated areas;
- prohibiting the use of compressed air for personal cleaning purposes;
- vacuuming dust from areas where cutting processes take place;
- keeping lids on containers when not in use;
- providing and using facilities for effective decontamination; and
- providing first aid, safety showers and eye wash facilities, evacuation procedures and emergency procedures.

**Personal Protective Equipment (PPE)** The basic personal protective equipment available to guard against risks from hazardous substances includes respirators, goggles, face shields, gloves, footwear, and aprons. Self contained breathing apparatus or hazardous chemical suits may be required if the risk of exposure is significant because a hazardous substance is present in an uncontrolled environment.

Situations where the use of suitable personal protective equipment may be necessary include:

- where it is not technically feasible to achieve adequate control by other means. In these cases, exposure should be reduced as far as practicable by other measures and then, in addition, suitable personal protective equipment should be used to secure adequate control;
- where personal protective equipment is necessary to safeguard health until such time as adequate control is achieved by other means, for example, where urgent action is required because of plant failure;
- during routine maintenance operations where the infrequency and small number of people involved may make other control measures not practicable; or
- where MSDS and labels indicate.

The ongoing costs (eg training and maintenance and/or replacement) and operator considerations<sup>10</sup> (eg correct fit and medical factors) associated with PPE should be given significant consideration before determining it as the preferred control option.

To ensure PPE is effective as a control it should be:

- selected for the contaminant, task and the operator in accordance with appropriate standards;
- readily available;
- clean and functional;
- checked before use;
- correctly used when required; and
- appropriately maintained.

Following the selection of appropriate PPE as a control measure, training should be provided to ensure it is properly used in accordance with the appropriate standards for the equipment.

<sup>10</sup> Refer to AS/NZS 1715 **Selection, use and maintenance of respiratory protective devices** for further information on selection factors relating to the use of respiratory protective devices.

## **STEP 9: Record the Assessment**

Assessment reports should reflect the detail of the assessment, and provide sufficient information to show how the decisions about risk and controls were made.

The risk assessment record should include:

- the name of the assessor or assessment team;
- personnel involved;
- description of the hazard and routes of entry to the body;
- description of normal operations in the work area;
- procedures used to assess exposure;
- procedures used to assess the degree of exposure;
- procedures used to assess existing control measures;
- conclusion from the assessment whether the risk was not significant or significant;
- action to be taken;
- induction, training, emergency procedures and health surveillance action to be taken;
- the circumstances when reassessment will be required;
- signature, date and position of the assessor/assessment team; and
- signature, date and position of the employer accepting the assessment.

A standard format might be considered.

## **STEP 10: Review of Control Measures**

All measures for the control of exposure should be thoroughly examined and tested at regular intervals to ensure effective performance. Controls should be reviewed if work-related ill health is reported.

Routine maintenance including preventive service procedures should be established, specifying:

- which control measures require servicing;
- the servicing needed;
- the frequency of servicing;
- who is responsible for servicing;
- how any defects will be corrected;
- performance testing and evaluation; and
- record of servicing.

# **6. EMERGENCY PROCEDURES**

## **6.1 Procedures**

Even if control measures have been put in place, a leak, spill or uncontrolled release of a hazardous substance may still occur. Emergency procedures should be established, and used, if appropriate, to enable the source of a release to be safely identified and repairs to be made. All persons not directly concerned with the emergency should be excluded from the area of contamination.



## 6.2 Preparing an Emergency Response Plan

The emergency response plan should be prepared in consultation with the workers at the workplace and emergency service agencies where appropriate.

The issues which should be addressed in an emergency plan include the following:

- any on-site first aid or assistance which has to be administered in case of an accident due to over exposure to a hazardous substance;
- details of the building(s) on the site;
- the types of risks taken into account;
- emergency organisations and any mutual assistance resources involved including key personnel and responsibilities and liaison arrangements between them;
- emergency command structure and communications links including telephones, radios and standby methods;
- special equipment including fire fighting materials, damage control and repair items;
- the limits of on-site action prior to the seeking of outside assistance;
- technical information such as chemical and physical characteristics and dangers of every hazardous substance and plant;
- locations of the hazardous substances, personnel, equipment and emergency control rooms at the workplace; and
- evacuation arrangements.

## 6.3 Review of Emergency Response Plan

It is good practice to review an emergency response plan when:

- any hazardous substance is introduced to the workplace in a quantity which causes alteration to the placarding requirements<sup>11</sup>;
- a change is made in the way a hazardous substance is stored, handled or used;
- a change is made to a process or procedure which may result in a change of risk; and
- new information becomes available concerning any property of a hazardous substance which could lead to a significant risk.

## 6.4 Emergency Service Agencies

Emergency service agencies should be provided with information on the hazardous substances present at the workplace as well as other relevant information such as the hazardous substances register and emergency response plan. However, it is not appropriate or necessary for emergency services to have access to monitoring or health surveillance results.

# 7 MONITORING

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** establishes a requirement to undertake monitoring if the risk assessment process requires it. The monitoring must be done at the workplace and a record of the result must be made as soon as possible. An **Employer** or **Self-employed Person must** –

- ensure a worker who may be exposed to a hazardous substance at the workplace is given a copy of the record; and
- allow a worker who may be exposed to inspect the record at any reasonable time.

<sup>11</sup> Placarding requirements for dangerous goods are set out in the **Dangerous Goods Safety Management Regulation 2001**

## 7.1 What is Monitoring?

This monitoring refers almost exclusively to monitoring of the air which a worker breathes, as the majority of occupational exposures to hazardous substances occur through inhalation. Knowing the extent of exposure to a hazardous substance is fundamental to providing adequate control against breathing a contaminated atmosphere. In rare cases, monitoring may also relate to exposure occurring via the unprotected skin, or even to the skin when personal protective equipment is worn.

The risk assessment process for hazardous substances in the **Workplace Health and Safety Regulation 1997** section 105 (see also Section 5.3, Step 6 (c) of this Advisory Standard) calls upon using information about exposure to assist in making that risk assessment. In most of the simpler cases, the extent of exposure can be gauged from observation and relevant detail from the label and MSDS. In some instances exposure can be tolerated without protection provided it is maintained within accepted limits.

There are some instances, however, where the procedure of observing a process aided by an MSDS and a label will not provide reliable estimates of exposure. Examples include:

- a respirable dust which workers are exposed to often cannot be seen;
- a visible dust concentration cannot be judged by eye;
- some airborne contaminants have no odour so their presence is undetected and hence underestimated;
- an exposure standard may be exceeded before an odour is detected;
- a strong odour at low concentration levels may lead to gross overestimation of exposure and exacerbate the perception of risk; and
- there is significant process or environmental variability which makes an unmeasured estimate of exposure unreliable.

## 7.2 The Role of Monitoring in Risk Assessment

Air monitoring provides a reliable estimate of exposure and is the primary means of making a comparison with exposure standards possible. Air monitoring is also used to help in correct selection of controls, including personal protective equipment. In some circumstances, monitoring can also be used to review the effectiveness of any newly introduced engineering or process controls.

## 7.3 What Monitoring Should Cover

Monitoring takes into consideration:

- individual worker behaviour by measuring concentration of contaminants in the worker's breathing zone;
- all environmental and process variables;
- collection of sufficient data needed to estimate any Time Weighted Average (TWA), Short Term Exposure Limit (STEL), Peak Limitation, or adjusted exposure standard that is appropriate for that hazardous substance in that work situation;
- correct selection of workers from groups doing the same or different tasks where it is not feasible to sample all workers;
- adequate statistical evaluation of measurements, including the number of measurements, to establish some confidence limits in the estimate of exposure; and
- whether monitoring is for simple legislative (pass/fail) compliance or more exacting health surveillance purposes.

## 7.4 Monitoring Procedures

Monitoring can be conducted both **in situ** in the workplace, using direct reading indicating devices, or by collecting a sample for later laboratory analysis, or a combination of both.



There are many different monitoring methods available to meet the large number of hazardous substances found in workplaces. Their reference and some commonly applied standard methods for field sampling are to be found in Appendix 1.

## 8. HEALTH SURVEILLANCE

Part 13 (Hazardous Substances) of the **Workplace Health and Safety Regulation 1997** sets out the requirement of an **Employer** or **Self-employed Person** to –

- arrange and pay for health surveillance if a risk assessment shows that an employer, self-employed person or worker has been exposed to a hazardous substance; and:
  - the hazardous substance is listed in Schedule 6<sup>12</sup> and the degree of risk to health is significant or
  - the employer or self-employed person reasonable believes, or ought to reasonably believe –
    - an identifiable adverse health effect may be related to exposure; and
    - the health effect may happen under the work conditions; and
    - a valid technique capable of detecting signs of the health effect exist or a valid biological monitoring procedure is available to detect changes from the current accepted values for the substance;

12 Schedule 6 – Hazardous Substances for which Health Surveillance must be Supplied

- arrange the health surveillance to be done by, or under the supervision of, a designated doctor;
- ask the designated doctor for a health surveillance report;
- ask the designated doctor to give the worker a health surveillance report<sup>13</sup> and an explanation of the report;
- obtain a worker's medical record only with the worker's written consent; and
- disclose the contents of the worker's medical record only with the worker's written consent.

## 8.1 What is Health Surveillance?

Health surveillance involves the medical monitoring of a person who may be exposed to a hazardous substance. This may be through the testing of body fluids such as blood and urine, or through testing of body function, for example, lung function tests for workers who work with respiratory sensitisers, or an examination of the skin.

Employers should not use health surveillance in place of atmospheric monitoring as an indicator of potential health effects. In addition, health surveillance is not an alternative to maintenance of control measures.

Further information about types of health surveillance, what health surveillance should cover and the role of biological monitoring can be found in the additional information provided in the back of this publication.

## 8.2 Requirement for Health Surveillance

Workers should be made aware that health surveillance is sometimes necessary to ensure their ongoing health. Health surveillance is often used in addition to workplace monitoring. Workplace monitoring will only indicate the potential for exposure of workers to a hazardous substance, it can never be an indication of the actual amount of substance absorbed or the effect on the body of absorbing the hazardous substance.

Workers should be made aware that their employer is required by law to ensure that workers exposed to a hazardous substance have health surveillance, where:

- it is required in the Regulation for exposure to that substance; or
- an identifiable adverse health effect has happened, or may happen under the worker's work conditions, and valid health surveillance or biological monitoring techniques exist.

**Note:** Examples of costs associated with health surveillance are:

- medical fees;
- pathology tests;
- travelling expenses; and
- time away from work.

13 "Health surveillance report" means information, other than a medical record, about -  
 (a) the effects on a person's health related to the person's exposure to a hazardous substance at a workplace; and  
 (b) the need (if any) for remedial action.

### **8.3 Selection of the Designated Doctor**

The Division of Workplace Health and Safety maintains a register of designated doctors for hazardous substances. Advice should be sought from industry associations, neighbouring businesses and others with similar concerns before selecting a designated doctor.

Choose a doctor who:

- is willing to visit the workplace so as to understand the hazards and work processes;
- demonstrates good interpersonal skills with workers; and
- is sensitive to other considerations intrinsic to the workplace.

### **8.4 Access of Information by a Doctor**

When the risk assessment requires health surveillance to be undertaken the doctor should be:

- provided with access to a list of the hazardous substances for which the workers are required to have health surveillance and a copy of the MSDS and exposure standards for those substances;
- provided with a list of the names of workers requiring health surveillance;
- permitted to have access to any relevant assessment reports; and
- provided with any air monitoring results.

## **APPENDIX 1 Sampling Techniques and Methods of Analysis**

Advice on suitable sampling techniques and methods of analysis can be found in the following publications:

- (a) Australian Standards, from Standards Australia, for example:
  - AS 3640 Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Inspirable Dust; and
  - AS 2985 Workplace Atmospheres – Method for Sampling and Gravimetric Determination of Respirable Dust; and
  - AS 2986 Workplace Atmospheres – Organic Vapours – Sampling by Solid Absorption Techniques; and
- (b) the National Commission's Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)];
- (c) the United Kingdom Health and Safety Executive's 'Monitoring Strategies for Toxic Substances', Environmental Hygiene, No.42;
- (d) the United Kingdom Health and Safety Executive's Methods for the Determination of Hazardous Substances, MDHS Series;
- (e) the United States National Institute for Occupational Safety and Health's Manual of Analytical Methods;
- (f) the United States National Institute for Occupational Safety and Health's Occupational Exposure Sampling Strategy Manual.

## APPENDIX 2 Appropriate Standards

Appropriate Standards for particular control measures in the Hazardous Substances Advisory Standard

STANDARD	DESCRIPTION
AS 1345 Identification of the contents of pipes, conduits and ducts	Specifies means of identifying the contents of pipes, conduits, ducts and sheathing used to contain fluids, or for the distribution of electrical or communications services in land installations and on board ships by the use of colours, words and symbols.
AS 1319 Safety signs for the occupational environment	Specifies requirements for the design and use of safety signs intended for use in the occupational environment to regulate and control safety related behaviours, to warn of hazards and to provide emergency information including fire protection information.
AS/NZS 1715 Selection, use and maintenance of respiratory protective devices	Sets out the principles of respiratory protection. Provides information concerning the effects on the body and protection from harmful substances and atmospheres deficient in oxygen. Offers guidance on considerations critical to the correct selection, use and maintenance of respirators specified in AS/NZS 1716. Advice on the range of protection factors and the level of protection provided by different respiratory devices is covered. Gives guidance on hazard reduction and respiratory protection programs.
AS/NZS 1716 Respiratory Protective Devices	Specifies performance and testing criteria for seven main types of respirators. General design requirements and test requirements are provided for each respirator category. Appendices include a method for testing total inward leakage of assembled respirators, as well as qualitative facial fit testing and testing of component parts.
AS/NZS 1337 Eye protectors for industrial applications	Specifies minimum requirements for eye protectors and associated lenses designed to provide protection for people's eyes in the industrial environment. Types of protection offered are for molten metal, airborne particles and fragments, harmful gases, vapours and aerosols, and sunglare and optical radiation in the natural environment. Markings for lenses to indicate the type of protection offered are also included.
AS 3765 Clothing for protection against hazardous chemicals	<p><b>AS 3765.1 Protection against general or specific chemicals</b> Specifies the performance requirements for materials and construction of suits to afford protection to the wearer against general chemicals or specific chemical where either sustained protection is required in the event of a spillage or where the chemical(s) are of a highly toxic or volatile nature. Requirements for gastight, ventilated and splash suits are included.</p> <p><b>AS 3765.2 Protection against specific chemicals</b> Specifies the requirements for protective clothing intended to provide limited protection against penetration by specific liquid chemicals where liquid chemicals in droplet form are to be protected against or where more substantial splashes of a chemical are sustained the clothing is able to be removed immediately.</p>

## APPENDIX 3 Meeting Your Obligations – Other Useful Documents

These documents are produced by the National Occupational Health and Safety Commission (NOHSC).

OBLIGATION HOLDER	REFERENCE MATERIAL
Manufacturers and Importers	<p><b>List of Designated Hazardous Substances</b> – This document is a quick reference to substances which have already been determined to be hazardous.</p> <p><b>Approved Criteria for Classifying Hazardous Substances</b> – This document sets out the criteria and process for determining whether a substance is hazardous or not.</p> <p><b>National Code of Practice for the Preparation of a Material Safety Data Sheet</b> – Sets out information regarding data required on an MSDS, and the method of presentation.</p> <p><b>Exposure Standards for Atmospheric Contaminants in the Occupational Environment</b> – Sets out exposure standards for a number of hazardous substances and includes explanatory material.</p>
Employers and Self-employed persons	<p><b>Exposure Standards for Atmospheric Contaminants in the Occupational Environment</b> – Sets out exposure standards for a number of hazardous substances and includes explanatory material.</p>
Suppliers	<p><b>National Code of Practice for the Labelling of Workplace Hazardous Substances</b> – This document sets out information regarding data to be contained on labels and its presentation.</p>

**Note:** Documents published or updated since 1995 are available on the NOHSC website [www.nohsc.gov.au](http://www.nohsc.gov.au)



## APPENDIX 4 Dictionary

**Biological monitoring** means testing for the presence of a hazardous substance, its metabolites or a biochemical change in a person's body tissue, exhaled air or fluid.

**Container** means a thing (other than a bulk container, or tank, defined in the ADG Code) in which a hazardous substance is, or has been, completely or partly cased, contained, covered, enclosed or packed, but does not include an enclosed system.

**Control measures** means the ways of preventing or minimising a person's exposure to a substance.

**Enclosed system** includes a pipe or piping system and a process or reactor vessel.

**Health surveillance** means the monitoring (including biological monitoring and medical assessment) of a person to identify changes in the person's health because of exposure to a hazardous substance.

**Medical record** of a person, means personal medical results or clinical findings obtained from health surveillance of the person.

**Monitoring** means regularly checking, other than by biological monitoring –

- (a) the person's risk from, or level of exposure to, a hazardous substance; and
- (b) the effectiveness of hazardous substance control measures at a person's workplace.

**National Exposure Standard** means the exposure standard for the hazardous substance stated in the Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment contained in NOHSC's document entitled 'Exposure Standards for Atmospheric Contaminants in the Occupational Environment'.

**Representative** of a worker, includes a coworker elected by workers at the worker's workplace to represent the worker on workplace health and safety issues.

**Substance** does not include a thing (other than a fluid or particle) –

- (a) formed during production to a predetermined design or shape or to have a predetermined surface; and
- (b) used for a purpose depending completely or partly on its design, shape or surface; and
- (c) keeping its chemical composition and physical state during use.

**Use** includes handling, production, storage, movement and disposal of the substance, but does not include the carriage of a substance covered by the ADG Code or the International Maritime Dangerous Goods Code.

## APPENDIX 5 Additional Information About Hazardous Substances

### NICNAS Summary Report

Further information about a hazardous substance can be obtained from the relevant NICNAS Summary Report, which only apply to pure substances.

NICNAS Summary Reports contain information about a hazardous substance including:

- the name or names by which a pure substance is known to the public or with new material, the name by which it is intended to be known by the supplier;
- the general uses of the hazardous substance;
- the precautions and restrictions to be observed in manufacture, use and disposal;
- recommendations relating to disposal of the hazardous substances and any neutralising processes;
- the procedures to be followed in the event of an emergency involving the hazardous substance;
- physical and chemical data about the hazardous substance; and
- relevant data relating to the occupational, public health and environmental effects of the hazardous substance.

These reports are available to employers and can be obtained from the manufacturer or importer of a hazardous substance on request. Information on the Summary Reports produced can be obtained by contacting the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) in the Commonwealth Department of Health and Ageing.

### Exposure Standards

Exposure standards have been set to minimise the effects of exposure of persons at the workplace to the effects of hazardous substances. The three forms of exposure standards are:

- time weighted averages;
- peak exposure limits; and
- short term exposure limits.

Monitoring is used to estimate the level of hazardous substance in the air. The results of the monitoring are compared with the exposure standard specified in “**Exposure Standards for Atmospheric Contaminants in the Occupational Environment**” published by the National Occupational Health and Safety Commission and available from the Australian Government Publishing Service. The monitoring results provide an indication of the effectiveness of the control measures used in the workplace.

Exposure standards do not represent ‘no effect’ levels at which every worker can be guaranteed no adverse health effect. While the exposure of all workers must be below the exposure standard, the level of exposure to any hazardous substance must always be as low as can reasonably be achieved. That is, compliance with the relevant exposure standard should not preclude efforts to reduce exposure further.

The absence of a specific exposure standard for a hazardous substance does not necessarily mean that exposure need not be controlled. Where there is no exposure standard, exposure should be controlled to the lowest practicable level.

## Health Surveillance

Health surveillance is the monitoring of a person's health to identify changes caused by exposure (if any) to the person's health. Health surveillance includes biological monitoring but does not include atmospheric monitoring.

Health surveillance may be conducted for every hazardous substance which has known and accepted procedures for surveillance. The purpose of health surveillance is to assist in minimising health risks from a hazardous substance by:

- confirming that biological monitoring results are within the acceptable range;
- identifying biological effects that require lower levels of exposure or no exposure; and/or
- collecting data to evaluate the effects of exposure.

### Types of Health Surveillance

The types of health surveillance procedures that may be followed include:

- biological monitoring, for example, measurement and assessment of hazardous substances or their metabolites in blood, urine or expired air;
- medical tests;
- medical examination;
- a review of present and past medical and work history; and
- a review of medical records and occupational exposure.

These procedures are not mutually exclusive and the results from one procedure may indicate the need for another. Non-invasive methods of testing such as analysis of expired air are generally preferable to invasive methods such as blood analysis, where equally meaningful results can be obtained.

### What Health Surveillance Should Cover

Health Surveillance generally takes into consideration:

- the nature and extent, including duration, of exposure;
- the changes attributable to exposure which may occur in exposed workers and the likelihood that a disease or adverse health effect may occur, which must both be related to the nature and degree of exposure;
- the frequency at which any changes may be expected to occur;
- an assessment of available epidemiological information on human exposure and toxicological data;
- the sensitivity, specificity and reliability of the detection and measurement of these changes;
- the remedial action which is available to reverse or arrest these changes; and
- the resources and levels of competence required to perform the necessary detection and/or measurement procedures.

Valid techniques for use in health surveillance are those of acceptably high sensitivity and specificity to detect adverse effects related to the nature and degree of exposure. Health surveillance procedures should be safe, easy to perform, non invasive where possible and acceptable to workers. Criteria for interpretation of the data should be obtained.

On advice received from a registered medical practitioner, health surveillance may be continued after exposure to a hazardous substance has ceased.

## **The Role of Biological Monitoring**

The assessment of the airborne concentration of a particular contaminant and the subsequent comparison with the appropriate exposure standard(s) is usually the primary technique for monitoring the working environment. However, in some situations this approach may be complemented by the use of biological monitoring techniques.

Persons differ from each other in size, fitness, personal hygiene, work practices, smoking habits, alcohol and drug usage and nutritional status. There are therefore differences between individuals in uptake, rates of metabolism and excretion of toxic substances and in the way a person's body will respond to a particular hazardous substance. Biological monitoring has the specific advantage that it can take account of these differences, enabling individual risk assessments to be made. In certain circumstances, biological monitoring serves as a useful adjunct to atmospheric monitoring in assessing actual occupational exposure.

For a limited number of substances, the application of biological monitoring can be particularly useful in suggesting the degree of skin absorption and, in some cases, can identify unknown or unexpected exposures which cannot be predicted from atmospheric monitoring alone. However, biological monitoring does have limitations, particularly in regard to the collection and preservation of samples and the interpretation of results. There is limited knowledge of suitable and definitive biological tests for most substances.

## **Hazardous Substances Generated by a Work Process**

Some work processes generate substances that can be hazardous to a person's health if they are absorbed into the body. The hazardous substance could be a by-product, waste or fugitive emission (a substance that briefly escapes from a process). Examples where this may occur include:

- fume generated from an electroplating process;
- fume generated from welding;
- carbon monoxide generated from gas operated forklifts; and
- dust generated from disturbance of insulation materials.

To warn workers that a process may generate a hazardous substance, articles used in the process (for example welding rods), should be appropriately labelled. The label should indicate the conditions of use that can lead to the production of hazardous substances and the necessary precautions. The articles should also be accompanied by an MSDS or other equivalent information.

Any relevant information about a hazardous substance that may arise through the use of an article or the application of a particular process should be made available to workers and workplace health and safety representatives.

The information should address issues such as:

- health effects; and
- precautions for safe use.

## **Obtaining Additional Information**

Additional information on hazardous substances may be obtained from:

- other advisory standards and guidance material on specific hazardous substances and processes published by the Division of Workplace Health and Safety, National Occupational Health and Safety Commission, Standards Australia, professional institutions, trade unions or industry organisations; and
- technical reference sources, for example, consultancy services, industry seminars, textbooks, scientific/technical papers, NICNAS Summary Reports, and computerised databases.

