The National Occupational Health and Safety Commission has declared a *National Code of Practice for the Preparation of Material Safety Data Sheets.*

National codes of practice declared by the National Commission under s.38(1) of the *National Occupational Health and Safety Commission Act 1985* (Cwlth) are documents prepared for the purpose of advising employers and workers of acceptable preventive action for averting occupational deaths, injuries and diseases in relation to workplace hazards.

The expectation of the Commonwealth Government and the National Commission is that national codes of practice will be suitable for adoption by Commonwealth, State and Territory governments. Such action will increase uniformity in the regulation of occupational health and safety throughout Australia and contribute to the enhanced efficiency of the Australian economy.

It should be noted that National Commission documents are instruments of an advisory character, except where a law, other than the National Occupational Health and Safety Commission Act, or an instrument made under such a law, makes them mandatory. The application of any National Commission document in any particular State or Territory is the prerogative of that State or Territory.

National Occupational Health and Safety Commission

NATIONAL CODE OF PRACTICE FOR THE PREPARATION OF MATERIAL SAFETY DATA SHEETS [NOHSC:2011(1994)]

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FOREWORD

The National Occupational Health and Safety Commission is a tripartite body established by the Commonwealth Government to develop, facilitate and implement a national occupational health and safety strategy.

This strategy includes standards development, the development of hazard-specific and industry-based preventive strategies, research, training, information collection and dissemination and the development of common approaches to occupational health and safety legislation.

The National Commission comprises representatives of the peak employee and employer bodies — the Australian Council of Trade Unions and the Australian Chamber of Commerce and Industry — as well as the Commonwealth, State and Territory governments.

Consistent with the National Commission's philosophy of consultation, tripartite standing committees have been established to deal with issues relating to standards development, research and the mining industry. Expert groups and reference groups may be established to provide advice to the standing committees on those issues with which the National Commission is concerned.

PREFACE

In September 1986 the National Commission published the first edition of the *Guidance Note for Completion of a Material Safety Data Sheet* [NOHSC:3001(1986)]. The guidance note provided general instructions on how to compile a Material Safety Data Sheet (MSDS), with standard content and format, containing the minimum information which was relevant and suitable for use in Australia. A glossary and sample form were also included. Two further editions of the guidance note were subsequently published.

In November 1992 the National Commission agreed that the guidance note should be converted into a national code of practice suitable for supporting its *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)]. Under these national model regulations, manufacturers and importers of workplace hazardous substances are required to produce MSDS and supply them to purchasers.

This national code of practice provides guidance on the preparation of MSDS to enable manufacturers and importers to meet their responsibilities and recognises certain overseas MSDS formats which provide equivalent or a better standard of information to that which would be provided using this national code of practice. Acceptable overseas formats include those of the International Labour Office (ILO) and European Communities (EC). The intention is to permit some flexibility in the format of a MSDS while ensuring that the information is provided in accordance with this national code of practice.

New arrangements for ingredient disclosure on MSDS and the protection of commercially confidential information are included in this national code of practice.

This publication is one of six titles produced by the National Commission and released together as part of its workplace hazardous substances regulatory package. The six titles that comprise the set are:

- *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)] (which is produced under the same cover as the national code of practice);
- *National Code of Practice for the Control of Workplace Hazardous Substances* [NOHSC:2007(1994)];
- *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)];
- *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2012(1994)];
- *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)]; and
- *List of Designated Hazardous Substances* [NOHSC:10005(1994)].

These publications are supplemented by the following titles:

- *Guidance Note for the Assessment of Health Risks Arising from the Use of Hazardous Substances in the Workplace* [NOHSC:3017(1994)]; and
- *Guidance Note for the Control of Workplace Hazardous Substances in the Retail Sector* [NOHSC:3018(19940].

Each publication may be purchased separately through Commonwealth Government Bookshops.

1. TITLE

1.1 This national code of practice may be cited as the *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)].

2. PURPOSE

2.1 The aim of this *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)] is to provide practical guidance on meeting the requirements for MSDS under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1].

2.2 Under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] it is the manufacturer or importer of a hazardous substance who is required to produce MSDS and supply them to purchasers.

2.3 This code of practice also advises on acceptable formats for MSDS.

3. SCOPE AND APPLICATION

3.1 This *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)] applies to the production of MSDS as required under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1].

3.2 The *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] establish the responsibilities of manufacturers and importers of hazardous substances to produce material safety data sheets (MSDS) for the hazardous substances which they supply.

3.3 A hazardous substance is one which is listed in the National Occupational Health and Safety Commission's *List of Designated Hazardous Substances* [NOHSC:10005(1994)][2] or which has been determined to be hazardous by the manufacturer/importer of the substance in accordance with the National Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

3.4 Where a requirement for the production of MSDS has been established under Commonwealth/state/territory dangerous goods legislation, this national code of practice also applies to the production of these MSDS.

4. DEFINITIONS

'**Acute toxicity**' means a toxic effect which occurs immediately or shortly after a single exposure.

'**ADG Code**'[4] ***see*** *Australian Code for the Transport of Dangerous Goods by Road and Rail*.

'**Allergic reaction**' means an over-reaction by the immune system to an antigen. It can take the form of a rash, asthma, breathing difficulties, weeping eyes or sneezing.

'**Antidote**' means a treatment for chemical over-exposure which is specific (more or less) to the chemical or class of chemicals, in contrast to supportive treatment which maintains body functions.

'**Appearance**' means a description of the physical state of the substance.

'**Article**' means an item which is formed to a specific shape, surface or design during production, has an end use function dependent in whole or in part on its shape or design, and which undergoes no change in chemical composition and physical state during the end use except as an intrinsic aspect of that end use. Fluids and particles are not considered articles, regardless of the shape or design.

'**Australian Code for the Transport of Dangerous Goods by Road and Rail' (ADG Code)**[4] means the code prepared by the standing national Advisory Committee on the Transport of Dangerous Goods and endorsed by the Australian Transport Advisory Council. The ADG Code is based on recommendations prepared by the United Nations Committee of Experts on the Transport of Dangerous Goods. The ADG Code covers the classification, packaging, marking and transport of dangerous good.

'**Australian Standard (AS)**' means a standard published by Standards Australia, formerly the Standards Association of Australia.

'**Autoignition temperature**' means the minimum temperature required to start or cause self-sustained combustion in any substance in the absence of a high temperature ignition source, such as a spark or a flame. This is not applicable to many substances.

'**Boiling point**' means the temperature at which the vapour pressure of a substance equals the atmospheric or other designated pressure**.**

'**Bulk density**' means the mass of a unit volume of powder, usually expressed in grams per cubic centimetre (g/cm^3) or kilograms per cubic metre (kg/m^3). It is determined by a specific method. Apparent density is an alternative, but less commonly used, term for bulk density. ***(See*** also density).

'**Cancer**' means a malignant tumour which can spread to other organs of the body. As distinct from a benign tumour which cannot. (Although leukaemia and some other malignant diseases are not solid tumours, they meet other criteria for cancer and can be, and often are, included under this definition.)

'**Carcinogen**' means an agent which is responsible for the formation of a cancer.

'**Carcinogenesis**' means the causing of cancer.

'**Carcinogenic**' means capable of causing cancer.

'**Chemical Abstracts Service Registry Number (CAS Number or CAS No.)**' means a unique number assigned by the Chemical Abstracts Service, Columbus, Ohio, USA[6].

'**Chronic toxicity**' means a toxic effect which occurs after repeated or prolonged exposure. Chronic effects may occur some time after exposure has ceased.

'Combustion' means the process of burning.

'Combustible liquid' means any liquid, other than a flammable liquid, that has a flashpoint, and that has a firepoint less than its boiling point, as defined by the ADG Code[4].

'Commercially confidential information' means information, such as chemical identity or exact composition, which, if made public, would significantly damage commercial interests.

'Concentration cut-off level' means the concentration level in the National Occupational Health and Safety Commission's *List of Designated Hazardous Substances* [NOHSC:10005(1994)][2], or assigned in accordance with the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

'Container' means anything in or by which hazardous substances are or have been wholly (or partly) cased, covered, enclosed, contained or packed, whether such a container is empty, or partially or completely full. Tanks and bulk storage containers, as defined in the ADG Code[4], are not included in the definition of 'container'.

'Correct shipping name' means a name for identifying substances classified as dangerous goods as specified by the ADG Code[4].

'Corrosive' means a substance which causes destruction of, or damage to, materials or living tissue on contact.

'Corrosive substance' means a substance which has been classified as a corrosive according to the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

'Dangerous goods' means substances which are either specifically listed in the ADG Code[4] or meet the classification criteria of the ADG Code[4].

'Dangerous goods class' means the class allocated to a substance under the ADG Code[4].

'Density' means the ratio of mass of a substance to its volume. It is usually measured at 20°C and expressed in grams per cubic centimetre (g/cm^3 or kg/m^3). (***See*** also bulk density).

'Dermatitis' means an inflammation of the skin. *Irritant contact dermatitis* is direct damage to the skin which is due to contact with the irritant substance, for example, acids, alkalis, organic solvents, in sufficient concentration and for sufficient time. It occurs soon after exposure and persists long after exposure has ceased. *Allergic contact dermatitis* is an inflammatory reaction caused by substances which penetrate the skin and cause a specific allergic response (sensitisation) after a variable lag period ranging from a matter of days to several months. Once sensitisation has occurred, exposure to only a relatively small quantity of the substance will trigger a reaction within 48-96 hours due to developed hypersensitivity of the body.

'Earth' means the electroconductive connection of containers to the ground to prevent shocks and sparks.

'Employee' means an individual who works under a contract of employment, apprenticeship or traineeship.

'**Employee representative**' includes an employee member of a health and safety committee where established in the workplace, or a person elected to represent a group of employees on health and safety matters.

'**Employer**' means a corporation or an individual who employs persons under a contract of employment, apprenticeship or traineeship.

Note: The definition of employer includes the self-employed which means a person who works for gain, other than under a contract of employment, apprenticeship or traineeship, whether or not that person employs others.

'**Entity**' means a single substance and includes discrete chemical elements, compounds and complexes which may exist as pure or technical grade or as components in a physical mixture of substances.

'**Evaporation**' means the change of a substance from a solid or a liquid into the gaseous phase.

'**Evaporation rate**' means the ratio of the time required to evaporate a measured volume of a liquid to the time required to evaporate the same volume of a reference liquid, usually ethyl ether or butyl acetate. The higher the ratio, the slower the evaporation rate. The term relative evaporation rate is also used to describe the above ratio.

'**Explosive limits**' ***see*** flammability limits.

'**Exposure standard**' means an airborne concentration of a particular substance in a person's breathing zone, as established by the National Occupational Health and Safety Commission's *Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:1003(1991)][5].

'**Flammability**' means the property which describes a danger of the product catching fire and under what conditions.

'**Flammability limits**' means the range of concentrations of a flammable vapour in air at which a flame can be propagated or an explosion will occur, if a source of ignition is present. Normally expressed as upper and lower limits of this range, as percentage of the volume of vapour in air. The term 'explosive limits' means the same as 'flammability limits'.

'**Flammable**' means that a substance is capable of being ignited and burning in air.

'**Flammable Liquid**' means a liquid which is capable of being ignited and burning in air and which meets the criteria of the ADG Code[4].

'**Flashpoint**' means the lowest temperature in °C at which a liquid will produce enough vapour to ignite, if the vapour is flammable. For a specific definition for the purposes of classifying substances, reference should be made to the ADG Code[4]. Flashpoint is established by closed or open cup methods. The lower the flashpoint, the higher the risk of fire.

'**Generic name**' means a name applied to describe a category or group of chemicals, for example, azo dyes and halogenated aromatic amines.

'**Hazard**' means an intrinsic capacity associated with an agent or process capable of causing harm.

'**Hazardous substance**' means a substance which:

(a) is listed on the National Occupational Health and Safety Commission's *List of Designated Hazardous Substances* [NOHSC:10005(1994)][2]; or

(b) has been classified as a hazardous substance by the manufacturer or importer in accordance with the National Occupational Health and Safety Commissions *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

'**Hazchem code**' means an emergency action code of numbers and letters which gives information to emergency services. Its use is required by the ADG Code[4]. ***See*** also Appendix 3 and Australian Standard AS 1216 *Classification, Hazard Identification and Information Systems for Dangerous Goods Part 2 - Hazchem Emergency Action Code*[4].

'**Identification**' means a section of a MSDS providing information on the name of a product, some of its other names, its use, properties and chemical composition.

'**Ignition**' means setting fire to or being set fire to.

'**Incompatibility**' means a situation where any substance or residue which, by combining chemically with the incompatible substances or promoting self-reaction or decomposition of the incompatible substances, may create a hazard.

'**Inflammation**' means a condition of a part of the body which involves heat, swelling, redness and usually pain.

'**Ingredient**' means any component of a substance (including impurities), in a mixture or combination.

'**Inhalation**' means breathing in.

'**Interaction**' means modification of toxic effects of one substance by another. The effects can be amplified (synergism) or reduced (antagonism).

'**Irritant**' means a substance that will produce local irritation or inflammation on contact with tissues and membranes, such as skin or eyes, or that will, after inhalation, produce local irritation or inflammation of nasal or lung tissue.

'**Label**' means a set of information on a container which identifies the substance in the container, identifies whether the substance is hazardous and provides basic information about the safe use and handling of the substance.

'**LC_{50}**' means a concentration of a substance (usually in air) that is estimated to produce death in 50 per cent of a population of experimental animals on inhalation for a short period of time.

'**LD_{50}**' means a dose of a substance that produces death in 50 per cent of a population of experimental animals. It is usually expressed as milligrams per kilogram (mg/kg) of body weight.

'**Material Safety Data Sheet (MSDS)**' means a document that describes the properties and uses of a substance, that is, identity, chemical and physical properties, health hazard information, precautions for use and safe handling information.

'**May**' means that a requirement is optional.

'**Melting point**' means the temperature at which a substance changes from solid to liquid. Normally measured in °C.

'**Mixture**' means a physical combination of chemicals resulting from the deliberate mixing of those chemicals or from a chemical reaction.

'**mm Hg**' means millimetres of mercury (Hg). This is a unit of pressure. (***See*** also Pascal).

'**Molar (M)**' means moles per litre. This is a unit of concentration.

'**Mole**' means gram molecular weight. This is a unit of mass.

'**Mutagen**' means an agent capable of producing a mutation.

'**Mutagenesis**' means the process of producing a mutation.

'**Mutagenic**' means able to produce a mutation.

'**Mutation**' means a change in the genetic material of cells.

'**Odour threshold**' means the minimum concentration of the substance in air which is capable of being detected by the human sense of smell. This is normally expressed in parts per million (ppm) or milligrams per cubic metre (mg/m^3).

'**Oral**' means ingested or administered via the mouth.

'**Oxidising property**' means a property of substances which, although not necessarily combustible, may readily liberate oxygen or be the cause of an oxidation process and which, as a result, may start a fire in other materials or promote the combustion of other materials.

'**Packaging group**', as defined by the ADG Code[4], means the division of dangerous goods of Classes 3, 4, 5, 6.1, 8 and 9 into three groups according to the degree of hazard they present: 'I' (great danger), 'II' (medium danger) and 'III' (minor danger).

'**Pascal**' means the SI unit of pressure. (***See*** also mm Hg). 101.25 kPa = 1 atmosphere = 760 mm Hg.

'**Per cent volatiles**' means the percentage of a chemical substance or substances that can be lost by evaporation.

'**pH**' means a value representing how acid or alkaline a solution is. Acids have a pH of less than 7. The lower the pH, the stronger the acid (normal minimum 0). Alkalis have a pH greater than 7. The higher the pH, the stronger the alkali (normal maximum 14). (0.01 M hydrochloric acid has a pH of 2. 0.01 M sodium hydroxide has a pH of 12. 0.1 M acetic acid, a weak acid, has a pH of 3 and 0.1 M ammonium hydroxide, a weak alkali, has a pH of 11).

As the pH scale (shown below) is logarithmic, the intervals are exponential, and thus represent far greater differences in concentration than the values seem to indicate.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
strong acid							neutral						strong alkali	

Pure water has a pH of 7. The pH of sea water is 7.8-8.2, pH of gastric juices is 1.7, pH of urine is 5-7, pH of blood is 7.3-7.5 and the pH of milk is 6.5-7.

'**Physical state/form**' means whether a product is in the solid, liquid or gaseous state at room temperature (20°C).

'**Poisons Schedule**' means a listing of substances requiring specific labelling and precautions in use. The *Standard for the Uniform Scheduling of Drugs and Poisons* (SUSDP)[7] is published by the National Health and Medical Research Council and is the basis for State and Territory poisons legislation.

'**ppm**' means parts per million. ppm (w/v) in water = mg/L ppm (w/w) in solids = mg/kg.

'**Practicable**' means 'practicable' in Victoria, Queensland, Western Australia and the Northern Territory, 'reasonably practicable' in New South Wales, South Australia, the Australian Capital Territory and Commonwealth jurisdiction and a 'reasonable precaution' in Tasmania.

'**Product name**' means the brand name, trade name or code name or code number specified by a supplier.

'**Risk**' means the likelihood that a substance will cause harm in the circumstance of its use.

'**Sensitisation**' means to become sensitive/allergic to the effects of minute quantities of a substance.

'**Sensitiser**' means a substance that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

'**Shall**' means that a requirement is mandatory.

'**Should**' means a recommendation.

'**Shock sensitivity**' means the tendency of a substance to explode if dropped or roughly handled.

'**Solubility**' means a measure of how soluble a substance is. Solubility in water is usually expressed as g/L. Other units include g/l00 cm^3, percent w/v or ppm of water.

'**Specific gravity**' means a measure of the density of a substance compared with water.

'**Standard for the Uniform Scheduling of Drugs and Poisons' (SUSDP)**[7] means the standard prepared by the National Health and Medical Research Council.

'**Subsidiary risk**' means a risk in addition to the class to which dangerous goods are assigned and which is determined by a requirement to have a subsidiary risk label under the ADG Code[4].

'**Substance**' means any natural or artificial entity, composite material, mixture or formulation, other than an article.

'**Supplier**' means an importer, manufacturer, wholesaler or distributor of workplace subastances, but excludes a retailer.

'**SUSDP**' ***see*** *Standard for the Uniform Scheduling of Drugs and Poisons*[7].

'**Teratogen**' means an agent capable of causing abnormalities in a developing foetus, that is, causing birth defects.

'**Teratogenesis**' means the causing of abnormalities in a developing foetus, that is, causing birth defects.

'**Teratogenic**' means able to produce abnormalities in a developing foetus, that is, causing birth defects.

'**TLV**' means Threshold Limit Value[8]. These values are a type of exposure standard promulgated by the American Conference of Governmental Industrial Hygienists (ACGIH).

'**Toxic effect**' means the property of an agent producing damage to an organism. This usually refers to functional (systemic) damage but may be developmental in respect of tissue and skeleton in the case of the embryo. The damage may be permanent or transient.

'**Trade name**' means a company product name which may or may not be registered.

'**Tumour**' means a swelling or enlargement or an abnormal mass of tissue in which the growth of cells is uncontrolled. A tumour can be either benign (not malignant) or malignant (cancerous). A tumour is also called a 'neoplasm'.

'**United Nations (UN) Number**' means a system of four digit numbers assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods. UN Numbers are assigned to one substance or to a group of substances with similar characteristics. They are not necessarily unique to one chemical, and may cover a group of chemicals with similar hazardous properties, for example, Organophosphorus pesticides, liquid, toxic - UN No. 3018.

'**Vapour density**' means the ratio of the density of the vapour compared to the density of air. The density of air is assumed to be 1.0. Vapours with a vapour density greater than 1.0 will tend to stay close to the floor, whereas vapours with a vapour density less than 1.0 will tend to rise.

'**Vapour pressure**' means the pressure created when a substance evaporates. This is the pressure of the vapour of the substance, at any given temperature, in equilibrium with its liquid or solid form. The higher the vapour pressure, the more the substance tends to evaporate.

'**Volatile**' means able to pass readily into the vapour state.

'**w/v**' means weight per volume. This is a measure of the content of a solid in a solution.

'**w/w**' means weight per weight. This is a measure, for example, of the content of a solid in a solid.

'**v/v**' means volume per volume. This is a measure, for example, of the content of a liquid in solution.

5. INTRODUCTION

5.1 Although many substances may present hazards at work, provided these hazards are known and understood and appropriate precautions taken, hazardous substances can be used safely. The key to this is the provision of adequate information about the substance, effective dissemination of this information, followed by its proper use. A hazardous substance can be a single chemical or a mixture of two or more chemicals formulated to make a chemical product.

PROVISION OF INFORMATION

5.2 Material Safety Data Sheets (MSDS) are used internationally to provide the information required to allow the safe handling of substances used at work. MSDS assist employers to discharge their general duty of care to employees by providing them with information on the hazardous substances they are working with and the hazards associated with those substances. The MSDS provides information on:

(a) identification:

- **(i)** product name,
- **(ii)** physical description and properties,
- **(iii)** uses, and
- **(iv)** composition;

(b) health hazard information;

(c) precautions for use; and

(d) safe handling information.

5.3 Under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] and the Commonwealth, State and Territory regulations introduced in accordance with these national model regulations, employees shall have ready access to MSDS for hazardous substances at their workplace. They should also have access to this national code of practice and receive instruction on the content of MSDS, with particular emphasis on items which are most relevant to their workplace. In workplaces where a large proportion of workers are non-English speaking, the MSDS may require translation into the relevant language(s).

5.4 MSDS provide information to those who use the hazardous substance. The information given on the MSDS helps users of the hazardous substance to develop correct occupational hygiene and safety procedures and to exercise the desired degree of care.

5.5 With appropriate information users can:

(a) use hazardous substances correctly and safely;

(b) understand safety recommendations and the rationale for these recommendations;

(c) be aware of the results of failure to comply with these recommendations;

(d) recognise symptoms of overexposure; and

(e) take part in informed employer-employee discussions.

5.6 Manufacturers and importers are responsible for the preparation and provision of MSDS. Suppliers of hazardous substances are responsible for provision of the MSDS which the manufacturer or importer has prepared. Suppliers are not required to provide a MSDS on the first supply to retailers and retail warehouse operators for consumer packages which hold less than 30 kilograms or 30 litres and which are not intended to be opened on their premises.

5.7 A retailer or retail warehouse operator does not need to supply MSDS to purchasers of hazardous substances where those substances are contained in consumer packages holding less than 30 kilograms or 30 litres, intended for retail sale and which will not be opened on the retailer's or operator's premises.

5.8 Under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] and the Commonwealth, State and Territory regulation introduced in accordance with these national model regulations, manufacturers and importers shall provide a MSDS to the Australian National MSDS Repository (administered by Worksafe Australia), for each hazardous substance they supply. This repository is briefly described in Appendix 1 (clause A1.54) and further information is available from Worksafe Australia.

5.9 The MSDS is to be at least in English and should be relevant to Australian requirements. Some MSDS accompanying imported hazardous substances may need translation into English, reformatting and revision. The MSDS should always provide a contact point for further information which is within Australia.

REVIEW AND RE-ISSUE OF MSDS

5.10 Manufacturers and importers should review and, if necessary, re-issue a MSDS:

(a) whenever there is a change in formulation which:

(i) affects the hazardous properties of the substance,

(ii) alters the form or appearance of the substance, or

(iii) alters the mode of application of the substance;

(b) whenever there is a change to the substance which alters its health and/or safety hazard or risk;

(c) whenever there is new health and/or safety information on the substance; or

(d) to reflect new regulations and standards.

5.11 In any event, this review and, if necessary, re-issue shall be no longer than five years after the last date of issue of a MSDS.

MSDS AND EXPERT ADVICE

5.12 The MSDS is aimed at those handling and using the hazardous substance. Therefore the information should be stated in plain language and be understandable to the layperson. While the MSDS provides adequate information for most users, it should be recognised that the MSDS is not a substitute for expert advice. Expert advice may include advice on the development of better control measures such as engineering controls and safe handling practices.

MSDS TO COVER ALL USES

5.13 A MSDS for a product containing a hazardous substance should cover all major uses. For hazardous substances that are used to make a final product, for example, a two part resin, a MSDS should be provided for each component unless they are prepackaged as one product. In such situations there should be a cross-reference to other components in the product.

6. GENERAL GUIDELINES

6.1 All sections of a MSDS should be completed, even if only to say that an item is 'not available' or 'not relevant' as described below. Blank sections tend to confuse or mislead and are therefore unacceptable.

CORE INFORMATION

6.2 Core information is essential information that should always be included in a MSDS. In this code of practice all information items should be regarded as providing core information unless otherwise indicated.

CONDITIONAL INFORMATION

6.3 Conditional information is information which should be included where relevant and available. For example, in the 'Other Properties' sub-section, where relevant information is available on the oxidising properties of a substance, the information should be included in the MSDS being prepared.

INFORMATION - NOT AVAILABLE

6.4 If information is not available, this should be noted as 'not available'.

INFORMATION - NOT RELEVANT

6.5 If the information item is not relevant, this should be noted as 'not relevant'.

ABBREVIATIONS

6.6 Abbreviations such as 'N/A' or 'N/R' should not be used as their usage could lead to confusion, for example, 'N/A' may mean either 'not available' or 'not applicable'. In general, where abbreviations are used, a legend explaining the abbreviations should be included.

INFORMATION INDICATES NO HAZARD

6.7 If available information indicates there is no hazard, then this should be clearly stated.

LANGUAGE

6.8 The language used in the MSDS should be simple, clear and precise. Manufacturers and importers may find the use of standardised statements useful in this regard. Vague and misleading expressions should not be used. Phrases such as 'may be dangerous', 'no health effects', 'safe under most conditions of use', or 'harmless' are also unacceptable.

UNITS

6.9 Numbers and quantities should be expressed in units appropriate to Australia, for example, degrees °C, not degrees °F, litres, not gallons. In general, SI units (***see*** Australian Standard AS 1000, *The International System of Units (SI) and its Application*[9]) should be used. However, provision should be made for non-SI units where such units are in widespread usage in Australia, for example, mm of Hg for vapour pressure, and degrees °C not degrees K (Kelvin), for temperature.

FORMAT

6.10 A MSDS is not a fixed length document. The amount of information provided within the major sections of the MSDS is variable so that if there is a great deal of relevant information on one item, that section can be expanded. Similarly, if there is less information on a certain subject, that section of the MSDS can be contracted. An example format is given in Appendix 2.

6.11 The information content of a MSDS should always be at least equivalent to that described in this national code of practice.

6.12 A number of additional formats to that given in Appendix 2 are approved under this national code of practice namely those of the European Community (EC) and the International Labour Office (ILO).

PAGE NUMBERING AND HEADERS

6.13 All pages of a printed MSDS should be numbered and the total number of pages also given on each page, for example, 'page 1 of 3', 'page 2 of 3', 'page 3 of 3'. An acceptable alternative is to number each page and to indicate on each page whether there is a page following and on the final page that it is the last page. For speed of retrieval from files, the product name may be placed in the top right hand corner of the first page. It may also be helpful to include the product name and the manufacturer's name in a fixed position, such as the top right hand corner, on all pages of the MSDS.

GUIDELINES FOR INDIVIDUAL ITEMS

6.14 A MSDS for a specific hazardous substance should provide information in four sections. These are:

(a) Identification;

(b) Health Hazard Information;

(c) Precautions for Use; and

(d) Safe Handling Information.

6.15 The individual information items making up these sections are described in this national code of practice. The recommended format for each section of the MSDS is shown on the first left hand side page immediately before the description of the individual information items.

6.16 In addition to the four sections outlined above, 'Introductory Details' and 'Company Details' data precede the first section, and there is provision for 'Other Information' and 'Contact Point' data after the fourth section.

Page *x* of Total *y*
Date of Issue:

STATEMENT OF HAZARDOUS NATURE

COMPANY DETAILS

Company:

Address:

Telephone Number:

Emergency Telephone Number:

7. INTRODUCTORY AND COMPANY DETAILS

PAGE NUMBERING

7.1 This is a simple numerical system allowing identification of individual pages of the MSDS. The letter ***x*** represents the number of the page in consecutive order from number 1. The letter y represents the total number of pages in the MSDS and should be the same on every page. Alternatively, it is acceptable to number each page consecutively and to indicate for each page if there is page following and to indicate on the last page that it is the last one.

DATE OF ISSUE

7.2 The date of issue should be expressed as month/year. The month should not be written as a number.

STATEMENT OF HAZARDOUS NATURE

7.3 The introductory section of the MSDS should include a statement indicating whether the substance has been classified as hazardous to health in accordance with the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3]. The wording to be used is:

(a) 'Hazardous according to criteria of Worksafe Australia'; or

(b) 'Not classified as hazardous according to criteria of Worksafe Australia'.

7.4 The purpose of this statement is to identify those hazardous substances which must be considered in assessments undertaken in accordance with the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1].

7.5 The preparation of MSDS for substances not determined to be hazardous is not mandatory. However, some manufacturers and importers may prepare MSDS for these substances, as good practice.

COMPANY AND ADDRESS

7.6 The name of the Australian manufacturer or importer with an Australian address should be entered. Companies may wish to put their logo or letterhead in this area. Company's ACN numbers should be included in accordance with the requirements of the *Companies Act 1981 (Cwlth)*.

TELEPHONE NUMBER

7.7 The business telephone number should be in Australia and the area codes should be included.

EMERGENCY TELEPHONE NUMBER

7.8 An Australian telephone number on which information is available in cases of emergency should be included. Whether the number is available on a 24 hour basis should be stated.

TELEX AND FAX NUMBERS - CONDITIONAL ENTRY

7.9 Telex and fax numbers may also be included, where relevant/appropriate.

IDENTIFICATION

Product Name:

Other Names:

Manufacturer's Product Code:

UN Number:

Dangerous Goods Class and Subsidiary Risk:

Hazchem Code:

Poisons Schedule Number:

Use:

Physical Description/Properties

Appearance:

Boiling Point/Melting Point:

Vapour Pressure:

Specific Gravity:

Flashpoint:

Flammability Limits:

Solubility in Water:

Other Properties:

Ingredients

Chemical name:	CAS Number:	Proportion:

8. IDENTIFICATION

PRODUCT NAME

8.1 This is the name by which the product is known and should be exactly as shown on the product label. A product name may be a trade name, code name or code number as specified by the manufacturer or importer of the workplace hazardous substance.

OTHER NAMES

8.2 Other names or synonyms by which the product is labelled or commonly known in Australia should be given if applicable. For dangerous goods the correct shipping name, as outlined in the *ADG Code*[4] should be included in this sub-section if it has not appeared as the product name. The name, as outlined in the National Health and Medical Research Council's (NHMRC) *Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP)*[7], should be included in this sub-section if it has not appeared as the product name.

MANUFACTURER'S PRODUCT CODE

8.3 Any internal identification codes for the product should be included.

UN NUMBER, DANGEROUS GOODS CLASS AND SUBSIDIARY RISK

8.4 The United Nations substance numbers (commonly called UN Numbers), Dangerous Goods Class and Subsidiary Risk, as shown in the *ADG Code*[4] or State and Territory dangerous goods legislation, where the *ADG Code*[4] does not apply, should be provided. The Dangerous Goods Class serves two functions: firstly, as a means of identification of hazard and secondly, as an indication of the response required in the event of an emergency. It is therefore necessary for it to be listed twice, once in the 'Identification' section, and then again in the 'Safe Handling Information' section under 'Storage and Transport'. The packaging group given in the *ADG Code*[4] may also be given, where relevant.

8.5 If no UN Number or Dangerous Goods Class has been allocated to the hazardous substance, then the MSDS should state, for example, 'no UN Number allocated', 'no Dangerous Goods Class allocated' or 'none allocated'.

HAZCHEM CODE

8.6 The emergency action Hazchem Code of numbers and letters should be entered here as described in the *ADG Code*[4] (***see*** Appendix 3). Square brackets should be used to indicate symbols that are white on a black background, for example, 3[Y]E.

8.7 If there is no Hazchem Code then the MSDS should state that no Hazchem Code has been allocated to the hazardous substance, for example, 'no Hazchem Code allocated' or 'none allocated'.

POISONS SCHEDULE NUMBER

8.8 The Poisons Schedule number given in the NHMRC Standard for the *Uniform Scheduling of Drugs and Poisons*[7] or State and Territory poisons legislation, where the SUSDP does not apply, should be provided.

8.9 If the hazardous substance has not been scheduled, then the MSDS should state that there is no Poisons Schedule number allocated to the substance, for example, 'no Poisons Schedule number allocated' or 'none allocated'.

USE

8.10 All major recommended uses and methods of application of the product should be given in descending order of importance.

8.11 The recommended methods of application should, where possible, also be included. Examples of statements for this sub-section are 'a spray-on paint stripper' or 'a soak-tank decarboniser'.

PHYSICAL DESCRIPTION/PROPERTIES

8.12 The data included in this sub-section should apply to the hazardous substance as used at work. If the substance is a mixture or formulation, the physical data should describe the mixture or formulation not individual ingredients.

8.13 Where relevant, the units of measurement should always be clearly stated. The ratio should be specified for dimensionless (unitless) quantities. For example, write 'evaporation rate is x assuming that the evaporation rate of butyl acetate is equal to 1' or 'vapour density is x assuming that the density of air is equal to 1'.

8.14 The physical description/properties information is useful for estimating the potential for exposure, handling spills, designing ventilation systems, and aiding in the design, development and checking of safety controls and procedures.

8.15 Certain physical properties should always be stated on the MSDS. These core entries are described below.

Appearance

8.16 Appearance should be described in terms of colour, odour and form. For example, use 'brown viscous liquid with pungent odour', 'fine white fibrous material' or 'coarse grey powder with no odour'. Pack size and container type may also be useful and included where appropriate.

Boiling Point/Melting Point

8.17 Boiling point and/or melting point at 760 mm Hg should be indicated in degrees °C.

Vapour Pressure

8.18 Vapour pressure should be expressed in pascals or as mm of Hg at 25°C, and the appropriate units stated.

Specific Gravity

8.19 This is the ratio of the density of the product compared to the density of water.

Flashpoint

8.20 In general terms, this is the lowest temperature in degrees °C at which a liquid will produce enough vapour to ignite, if the vapour is flammable. Flashpoints vary according to the method of determination, so the entry should specify whether the flashpoint was determined by an open or closed cup method according to Australian Standard AS 2106 *Methods for the Determination of the Flashpoint of Flammable Liquids (Closed Cup)*[10], or an internationally recognised method providing that this method used is stated.

Flammability Limits

8.21 This indicates the range of concentrations of a flammable vapour in air at which a flame can be propagated or an explosion will occur, if a source of ignition is present. Upper and lower limits of this range expressed as volume percentages in air should be included. The terms 'flammability limits' and 'explosive limits' have the same meaning.

Solubility in Water

8.22 Solubility in water should be expressed in g/L although g/100 cm^3, or parts per million (ppm) parts of water may also be used. The temperature, in °C, at which the solubility was measured should be stated if it is known.

OTHER PROPERTIES

8.23 This sub-section should include all data on the physical properties of the hazardous substance not provided elsewhere. These other physical properties should include where relevant and available:

(a) shock sensitivity;

(b) corrosiveness;

(c) oxidising properties;

(d) reactivity with common substances (for example, air or water);

(e) autoignition temperature;

(f) evaporation rate;

(g) vapour density;

(h) odour threshold;

(i) pH, at stated concentration;

(j) solubility in organic solvents;

(k) per cent volatiles;

(l) volatile organic compounds; and

(m) bulk density.

INGREDIENTS

8.24 This sub-section should describe the chemical composition of the hazardous substance. It should be completed both for pure entities (single substances) and for mixtures.

8.25 An ingredient is any component or substance, in a mixture or combination.

8.26 Ingredient details should be listed in a column format under the three headings Chemical name, CAS Number and Proportion.

Chemical name

8.27 Each hazardous ingredient present in a mixture, including impurities, should be listed by its common chemical name. The common synonyms, including recognised abbreviations, used for the ingredient in Australia may also be given. For example, write 'TDI' for toluene diisocyanate. ***See*** the 'Commercially Confidential Information' sub-section below for the exceptions to this requirement.

CAS Number

8.28 Each ingredient should be listed with its Chemical Abstracts Service (CAS) Number. ***See*** the 'Commercially Confidential Information' sub-section below for exceptions to this. Further guidance on CAS Numbers is provided in Appendix 4.

Proportion

8.29 Ingredients should be listed with the ingredient representing the highest proportion of the product first and so on in descending order. Percentage compositions should add up to or indicate a total of 100 per cent.

Commercially Confidential Information

8.30 In most cases there should be full public disclosure of ingredients. However, under certain conditions non-disclosure of commercially confidential information about ingredient identity may be permitted, subject to the following provisions.

Ingredients for Which Full Disclosure is Required

Type I Ingredients

8.31 Full disclosure will always be required for some ingredients.

8.32 Manufacturers or importers shall disclose on the MSDS for a hazardous substance the chemical name of any ingredient which:

(a) in accordance with the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3] is carcinogenic, mutagenic, teratogenic, a skin or respiratory sensitiser, very corrosive, corrosive, toxic or very toxic, a harmful substance which can cause irreversible effects after acute exposure, or a harmful substance which can cause serious damage to health after repeated or prolonged exposure;

OR

(b) has an exposure standard listed in the National Occupational Health and Safety Commission's *Adopted Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:1003(1991)][5]

AND

(c) is present in a quantity which exceeds the lowest relevant concentration cut-off level specified for the hazard classification in the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

8.33 A claim of commercial confidentiality cannot be made in relation to any ingredient which meets these criteria.

8.34 Generic names are not permitted for any of the above type I ingredients.

8.35 Where an ingredient meets the criteria of sub-clause 8.32(a) but does not exceed the relevant concentration cut-off level, it is regarded as a **type III** ingredient (***see*** sub-clauses 8.40 to 8.41 below).

Substances for Which Generic Names May be Used With Notification to Worksafe

Type II Ingredients

8.36 The manufacturer or importer may use a generic name on the MSDS, in place of the chemical name of an ingredient, if:

(a) the ingredient is a harmful substance(not covered in sub-clause 8.32(a) above) in accordance with the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3];

AND

(b) is present in a quantity which exceeds the lowest relevant concentration cut-off level specified for the hazard classification in the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3].

8.37 The manufacturer or importer shall notify Worksafe Australia where a generic name is used in place of the chemical name for a commercially confidential type II ingredient. Application shall be made on the approved form available from Worksafe Australia.

8.38 The generic name used should describe the functionality of the ingredient which contributes the hazard. Appendix 6 provides guidance on the selection of a generic name.

Disclosure Requirements for Other Substances

Type III Ingredients

8.39 If an ingredient is not a type I or a type II , then the chemical name need not be included by the manufacturer or importer in the MSDS. Instead a generic name for the ingredient, as precise as is reasonably possible should be used, for example 'organofluoride'. Notification to Worksafe Australia is not required if a generic name is used in place of the chemical name for these ingredients.

8.40 When use of a generic name is inadequate commercial protection, and the ingredient is not a hazardous substance, the general term 'Other ingredients determined not to be hazardous' may be used, except as described below.

8.41 Where a type III ingredient is not a hazardous substance but has known synergistic effects at least a generic name shall be used to identify it. The term 'Other ingredients determined not to be hazardous' ***shall*** not be used in these circumstances.

Disclosure of Commercially Confidential Information

8.42 Where the chemical identity of an ingredient has not been disclosed on the MSDS, it will be necessary to include on the MSDS the name and contact details where further information on confidential information can be provided. The manufacturer or importer has an obligation under the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] to disclose the chemical identity of an ingredient in specific emergency and non-emergency situations.

Emergency Disclosure of Information to Medical Practitioners

8.43 The chemical name shall be disclosed forthwith, to a medical practitioner, who determines that a medical emergency exists and requests the information for the purposes of providing proper emergency or first aid treatment. As soon as practicable after receiving the information the medical practitioner shall provide to the manufacturer or importer a written statement explaining why they need to obtain the information:

8.44 The written statement provided by the medical practitioner should include the following information:

(a) name and address of the applicant;

(b) product name;

(c) generic name of the commercially confidential substance (where applicable);

(d) medical or occupational health need for the information;

(e) reason why disclosure of the specific chemical name is essential; and

(f) reason why alternative information is not sufficient.

8.45 A written undertaking shall be provided by the person receiving the commercially confidential information in consideration of being given access to this information. The undertaking shall include a commitment that the information will not be used for any other purpose than the purpose for which it was released. Such an agreement may describe the type of information provided, state the purpose for which the information is to be used, and should provide an undertaking that, except insofar as is necessary to achieve the specified purpose of the release, the information will not be divulged or communicated to any other person. A sample form for such a confidentiality agreement is given in Appendix 7.

Non-Emergency Disclosure of Information to Other Persons

8.46 An employer, employees, personnel authorised by them or relevant public authorities may in writing apply to a manufacturer or importer to disclose the chemical name of an ingredient, for the purposes of protecting the health of any person who might be exposed to the substance through its use at work.

8.47 A manufacturer or importer shall respond in writing to an application within 30 days of receipt. In responding to the application the manufacturer or importer shall:

(a) disclose the chemical name of the ingredient; or

(b) if not satisfied of the need to disclose the chemical name, provide:

(i) sufficient evidence and specific reasons for refusal of the application, and

(ii) alternative information which satisfies the reasons why the information was requested without revealing the specific chemical identity.

Formulation Confidentiality

8.48 If the exact amount of the ingredient in the formulation cannot be specified, then the proportion ranges of each ingredient contained in the product should be indicated so as to provide as much information as possible about the potential hazards of a formulation. The following proportion changes are recommended:

< 10% 10 - < 30% 30 - 60% > 60%

Examples of Completed Ingredients Sub-section of the Identification Section

8.49 Examples 1, 2 and 3 are for a mixture of methyl chloride, fluoromethane, ethyl chloride, nitrogen and impurities. Example 4 is for a solution containing sodium chloride, magnesium sulphate and sodium cyanide as a contaminant. All concentrations in examples 1-3 are expressed as v/v (volume per volume) and in example 4 as w/v (weight per volume).

8.50 *Example 1*: Where there is full disclosure of the ingredients and composition of the mixture:

nitrogen	[7727-37-9]	69%	
methyl chloride	[74-87-3]		20%
fluoromethane	[593-53-3]	5%	
ethyl chloride	[75-00-3]	5%	
impurities			1%

8.51 *Example 2*: If the exact composition of the mixture is commercially confidential:

methyl chloride	[74-87-3]		10 -< 30%
fluoromethane	[593-53-3]	< 10%	
ethyl chloride	[75-00-3]		< 10%
impurities			< 10%
nitrogen	[7727-37-9]	to 100%	

8.52 *Example 3*: If the identity of one ingredient is commercially confidential and it is not a hazardous or dangerous substance:

nitrogen	[7727-37-9]	69%	
methyl chloride	[74-87-3]		20%
organofluoride			5%
ethyl chloride	[75-00-3]		5%
'Ingredients determined not to be hazardous'			to 100%

8.53 *Example 4*: For a solution of sodium chloride and magnesium sulphate in water with sodium cyanide as a contaminant:

sodium chloride	[7647-14-5]	15% w/v
magnesium sulphate	[7487-88-9]	3% w/v
sodium cyanide	[143-33-9]	0.5% w/v
water		to 100%

Notes on Complex Mixtures

8.54 It may be very difficult to identify the ingredients of some complex mixtures. In addition, the chemical composition of some complex mixtures may vary according to their source. Under these circumstances, the 'Ingredients' sub-section for a complex mixture should provide as much information as possible. Chemical classes should be distinguished as much as possible, for example, aliphatic or aromatic hydrocarbon, aliphatic alcohol or phenol, silica or silicates. Where relevant, the ranges given in the 'Formulation Confidentiality' sub-section should be used to cover the variability in the composition of the complex mixture. If this is done, a statement should be made that the exact composition of the complex mixture is not known. The list of ingredients is not required if the toxicity of the complex mixture is provided.

HEALTH HAZARD INFORMATION

Health Effects

Acute
Swallowed:
Eye:
Skin:
Inhaled:

Chronic:

First Aid

Swallowed:
Eye:
Skin:
Inhaled:
First Aid Facilities:

Advice to Doctor:

9. HEALTH HAZARD INFORMATION

9.1 All information needed in this section is core information.

HEALTH EFFECTS

Requirements for Health Effects Sub-section

9.2 In this sub-section a summary of health effects following short term (acute) and long term (chronic) exposure should be given. For mixtures for which no toxicity information is available or can be estimated, a paragraph on the health effects of each ingredient determined to be hazardous (***see*** also the 'Completing the Health Effects Sub-section for Mixtures' sub-section 9.21-9.27) should be given.

9.3 Entries in the 'Health Effects' sub-section should be clear and understandable to the layperson. Technical jargon should be avoided as much as possible or be accompanied by a simple explanation for the terms used, for example, 'hepatocellular carcinoma (cancer of the liver)'. Animal toxicity data should not be included at the expense of human data, though some animal data may be needed, especially if there is a lack of human data. Such data may also be included in the 'Other Information' section of the MSDS. Some reference texts code toxicity data, for example, 'skn-rbt 350 mg/24 HR SEV', meaning '24 hours after application of 350 mg, rabbit skin showed severe irritation'. When included in the MSDS, this information should be written in full. Commonly used terms such as 'LD_{50}' are acceptable but should not be used in isolation. When quoting toxicity data, it is especially important to state the route of administration and species used.

9.4 General statements such as 'toxic' with no supporting data or 'safe if properly used' are not acceptable as they may be misleading and do not provide a description of health effects. Where information is not available, this should be stated. Phrases such as 'not applicable', 'not relevant', or leaving blank spaces in the health effects section can lead to confusion and misunderstanding and should not be used. In all cases, some information should be provided even where there is no information on human health hazard. For example, use 'has been shown to be non-irritant' or 'does not present an inhalation hazard as the solid substance has a very low vapour pressure' rather than stating 'not relevant' or 'not applicable'.

9.5 The following information should be supplied:

(a) Information on both **acute and chronic health effects** relating to human exposure to the substance, if available. Where human data is not available, animal data should be summarised and the species clearly identified. Relevant negative data should be included, for example, the statement 'carcinogenicity studies in the rat have shown no significant increase in the incidence of cancer' provides useful information.

(b) The effects of each possible **route of exposure** should be included to highlight any health effects which may result through ingestion (swallowing), inhalation or skin absorption due to poor hygiene or accidental contamination. A statement should be made if these health effects are not known.

(c) The ***range of symptoms of exposure*** from the first symptoms at the lowest exposures to the consequences of severe exposure, for example, 'headaches and dizziness may occur, proceeding to fainting or unconsciousness; large doses may result in coma and death'.

(d) The ***dose, concentration or conditions of exposure*** likely to cause injury. Where possible, doses should be linked to symptoms and effects and include the period of exposure likely to cause harm. This is particularly important for inhalation hazards, for example, '10 ppm respiratory irritation, 250-300 ppm difficulty in breathing, 500 ppm unconsciousness leading to death after 30 minutes'.

9.6 Additional relevant information should be included, for example, if symptoms are exacerbated by drinking alcohol, taking medication or smoking, if the substance is secreted in breast milk, or if pre-existing medical conditions such as asthma, high blood pressure or a predisposition to allergic reactions may place an individual at an increased risk.

9.7 The 'Health Hazard Information' section should also, if possible, indicate whether delayed effects can be expected after short or long term exposure.

9.8 Health effects should be described accurately and relevant distinctions made. For example, allergic contact dermatitis and irritant contact dermatitis should be distinguished from each other.

9.9 Carcinogenicity data should include whether the evidence is animal or human, the type of study and the type of cancer and/or organs affected, for example, 'epidemiological studies indicate an increased incidence of leukaemia in workers exposed to this chemical' or 'feeding studies in rats indicate a significant increase in the incidence of bladder cancer'.

9.10 In addition, where possible, an indication of the weight of evidence for carcinogenicity in humans should be included. This can be obtained from government/international agencies which evaluate the carcinogenic potential of selected substances. A sample statement would be 'has been classified as a probable human carcinogen by the International Agency for Research on Cancer'.

9.11 It may not always be possible to obtain comprehensive information on the hazards of a substance as many have never been fully tested. In cases where data on the specific substance are not available, data on the chemical class, if appropriate, may be used. Where generic data are used or where data are not available, this should be stated clearly on the MSDS.

9.12 Although health hazard information should not be regarded as commercially sensitive information, and should always be disclosed, commercial confidentiality provisions may allow a substance to be identified by a generic name. In such instances, the 'Health Effects' sub-section should contain information on the particular substance, where this information is available. Where this information is not available, general chemical class information may be used and this should be stated in the MSDS, for example, 'organofluorides may cause dizziness, drowsiness or headache at moderate concentrations and narcosis at high concentrations'.

Interpreting Animal and Human Data

9.13 Information on the toxicity of substances can come from a variety of sources, including studies on humans, animals and other biological systems such as bacteria.

9.14 Most human data are obtained by studying the effects of long term occupational and environmental exposure, or short term accidental exposure. There are difficulties with interpreting this data, particularly for chronic effects, as many factors may influence results. People are exposed to many substances during their lifetimes and it may be difficult to isolate the effects of a particular substance. There are differences such as age and lifestyle (diet, smoking, drinking and so on) which have a bearing on the health of individuals and may influence results. A report of an effect in only one or two people may be coincidental. In addition, as most diseases occur in the population without recognised exposure to specific hazards, it is therefore an increase in the incidence of such a disease which should be detected.

9.15 Ideally, information used for the completion of a MSDS should show that exposure has occurred and that the reported effect is associated with this exposure. This is shown by either the effect occurring in more individuals as exposure levels increase or the effect becoming more marked with greater time of exposure. Due to the inadequacy of human data, this is very difficult and therefore available human data should be phrased to indicate the weight of evidence for the link between exposure and effect, for example, 'epidemiological studies in workers in the manufacturing industry indicate a slight increase in the incidence of lung tumours'.

9.16 In cases where human data are either not available or are inadequate to enable an assessment of the health effects of a substance, animal data should be used where it exists. Results of animal studies are easier to interpret than human studies as factors such as age and diet can be controlled. However, problems can still occur with interpretation of such information and the validity of exposure results should be assessed by people with relevant expertise.

9.17 Extrapolation of animal data to humans is not an easy task. It relies on a number of assumptions being made which may or may not be correct. For example, humans may absorb, metabolise or excrete a chemical differently from animals, the target organ in humans may not be the same, and so on. In some cases, extrapolation will be relatively straightforward. For example, if a substance is a severe eye irritant in animals it can be assumed to be so in humans. Effects resulting from repeated or prolonged exposure are more difficult to extrapolate and in these cases a summary of the animal evidence should be provided.

9.18 A number of government and international agencies evaluate chemical toxicity data and publish reviews. For example, the World Health Organization publishes *Environmental Health Criteria*[11] on selected substances and a number of governments publish documentation for exposure standards. These texts are prepared by experts and if the texts are current, there should be no need to re-evaluate the data. A list of useful information sources is included in Appendix 1.

Examples of Completed Health Effects Sub-section

9.19 ***Example 1***: This substance has a high acute toxicity in humans, is an irritant and animal data indicate concern for chronic exposure. A mist or aerosol of the substance can be present in the workplace where this substance is used.

Acute

Swallowed: May cause headache, weakness and cyanosis (bluish discolouration of the mucous membranes and skin which indicates that the supply of oxygen to the body is too low). Range of reported toxic doses (human) ... mg/kg to ... mg/kg in a single dose. Large doses may lead to loss of consciousness and possible death. Lowest reported lethal dose (human) ... mg/kg in a single dose.

Eye: Mild irritant.

Skin: Mild irritant, poorly absorbed through the skin.

Inhaled: Inhalation of mists and aerosols may produce respiratory irritation and coughing with frothy sputum. Inhalation of high concentrations (greater than approximately ... ppm) may lead to death due to respiratory collapse.

Chronic

Repeated or prolonged exposure may cause allergic contact dermatitis. Animal studies indicate that repeated or prolonged exposure could result in cirrhosis in humans (irreversible liver damage).

9.20 ***Example 2***: This substance has been in use in industry for a number of years. The only data available from the literature indicate that it is non-irritant and produces mild gastrointestinal effects when swallowed.

Acute

Swallowed: No evidence for humans. From animal evidence, the only reported effect is diarrhoea following large doses.

Eye: Not irritating to the eye.

Skin: Not irritating to the skin.

Inhaled: This substance has been in use since 1975 in the USA and Canada and there have been no reports in the literature of inhalation health effects in humans. There are also no reports of adverse inhalation health effects from animal studies carried out.

Chronic

There have been no reports in the literature of health effects in workers arising from long term exposure to this substance and no comprehensive human studies have been conducted. No animal studies have been conducted for long term effects.

Completing the Health Effects Sub-section for Mixtures

9.21 Often the hazardous substance requiring a MSDS will be a mixture. However, much of the information available from reference texts and databases relates to single substances.

9.22 In such situations, health effects and dose-response data should be collected for all ingredients, including any possible impurities, as well as any likely reaction products. All ingredients should be considered because even substances present in low concentrations may be highly toxic. The information on dose-response allows a decision to be made on the likelihood of toxicity occurring at the concentration present in the mixture.

9.23 After collecting data on health effects and dose-response for each ingredient, an estimation of the combined health effects needs to be made. This should take into account:

(a) the concentrations of the ingredients;

(b) the potential airborne concentrations of the ingredients;

(c) other conditions that may lead to exposure; and

(d) any possible interactions in the body between the ingredients in the mixture.

9.24 Ingredients may interact with each other in the body resulting in different rates of absorption, metabolism and excretion. As a result, the toxic actions may be altered and the overall toxicity of the mixture may be different from its ingredients.

9.25 Next, it is necessary to consider whether the concentration of each constituent is sufficient to contribute to the overall health effects of the product. The information on toxic effects should be presented for each substance except:

(a) If the information is duplicated, it is not necessary to list this more than once. For example, if one substance causes mild gastrointestinal discomfort on ingestion while another causes vomiting and diarrhoea, it is not necessary to list this twice. The overall product is described as causing vomiting and diarrhoea.

(b) If it is unlikely that these effects will occur at the concentrations present. For example, when a mild irritant is diluted in a non-irritating solution, there comes a point where the overall mixture would be unlikely to cause irritation.

9.26 There are a number of ways in which substances can interact in the body, for example:

(a) the effects of substances may add up to give a greater response;

(b) they may antagonise each other so that the effect seen is reduced; or

(c) the effect of one substance may enable another to produce a much increased effect (synergism).

9.27 Often the interactions between substances are not known and cannot be predicted. Some information is available for certain combinations of substances, and if information is available, it should be included in the MSDS. Predicting the interactions between substances is extremely difficult, and where information on interactions is not available, assumptions should not be made and instead the health effects of each substance should be listed separately.

Example of Completed Health Effects Sub-section for a Mixture Containing Two Substances

9.28 The example is for a product containing:

(a) substance A (98 per cent), an irritant, skin sensitiser and central nervous system depressant; and

(b) substance B (2 per cent), causes cancer in animals.

Acute

Swallowed: Due to the presence of substance A, this product may cause nausea, vomiting, dizziness and mental confusion. High oral doses may result in loss of consciousness and possible death. Range of reported lethal doses (human) ... mg/kg to ... mg/kg in a single dose for substance A.

Eye: Moderate eye irritant (due to substance A).

Skin: Mild skin irritant and potent skin sensitiser (due to substance A). Repeated exposure may cause allergic contact dermatitis. The potential for skin absorption is not known.

Inhalation: Vapour of substance A is irritating to the upper respiratory tract at levels above approximately ... ppm. Higher concentrations may result in headaches, dizziness and nausea, and then central nervous system depression, which can lead to loss of coordination and impaired judgement. Prolonged exposure can lead to unconsciousness and death.

Chronic

Substance A is a potent skin sensitiser. Repeated or prolonged exposure may cause allergic contact dermatitis. Substance B may cause cancer. Substance B has been shown to cause cancer of the kidney in mice. However, no cases of kidney cancer in workers exposed to substance B have been reported.

Complex Mixtures

9.29 There may be information on some complex mixtures, such as Portland Cement, and petroleum products, for example, Stoddard solvent or distillate cuts. As the chemical composition, and therefore the toxicity, of complex mixtures may vary, care should be taken to ensure that any information included in the MSDS is appropriate for the particular product. If adequate information is available on the complex mixture itself, it may not be necessary to provide information on the effects of each ingredient.

FIRST AID

9.30 The instructions in this sub-section should be addressed to exposed individuals, bystanders, first aid officers and ambulance officers. They should describe the initial care that can be given without the use of sophisticated equipment and without a wide selection of medications available. If medical attention is required, the instructions should state this, including its urgency. If specific first aid facilities, such as showers or eye washes, are necessary in a workplace where the particular substance is used, this should be stated on the MSDS.

9.31 Examples of suitable instructions may be found in the National Commission's *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2012(1994)][12] and the NHMRC's SUSDP[7]. The *SUSDP* contains a list of first aid phrases which under State and Territory poisons legislation need to be used when completing this section for scheduled poisons.

9.32 Other examples of first aid instructions include the following:

(a) 'Remove from exposure. Apply artificial respiration if not breathing';

(b) 'Give water or milk to drink and induce vomiting';

(c) 'Do not induce vomiting';

(d) 'Wash continuously with water for 15 minutes';

(e) 'Urgently seek medical assistance';

(f) 'Seek medical advice. Show this MSDS to a medical practitioner';

(g) 'Transport to a hospital or medical centre'; and

(h) 'For further information, contact the Poisons Information Centre'.

ADVICE TO DOCTOR

9.33 This sub-section should be compiled in consultation with individuals with relevant expertise, for example, an occupational physician. It should contain information of a specific nature that will be of use to medically trained personnel. It is not necessary to word this sub-section in lay terms.

9.34 Specific antidotes should be indicated where they are available. Specific treatments and contra-indicated treatments should be stated where applicable.

PRECAUTIONS FOR USE

PRECAUTIONS FOR USE
Exposure Standards: Engineering Controls: Personal Protection: Flammability:

10. PRECAUTIONS FOR USE

10.1 The precautions for use included in this section should be appropriate for the intended application and common uses of the hazardous substance and should provide sufficient detail for developing safe working practices. If particular applications require additional precautions, these should be stated. Where it is reasonable for a manufacturer or importer to anticipate a wrong use or misuse that could result in a hazard to the user, a cautionary warning should be given.

10.2 Emphasis in the MSDS should be on engineering methods of minimising and controlling exposure to hazardous substances or dangerous goods rather than on administrative controls or the need for protective clothing. For the control of exposure to hazardous or dangerous substances, there is a clear hierarchy of control measures (***see*** the *National Code of Practice for the Control of Workplace Hazardous Substances*[13]). These measures are:

(a) elimination of hazardous or dangerous substances from the workplace;

(b) substitution by a less hazardous or dangerous substance;

(c) isolation of the process to control the emission of substances;

(d) engineering controls, including local exhaust ventilation for vapour, gases or particulates, to contain the process or minimise exposure to substances;

(e) adoption of safe working practices; and

(f) where other effective means of controlling the hazard are not practicable, suitable, approved personal protective equipment will need to be used.

10.3 Elimination from the workplace or substitution by a less hazardous substance may be a consequence of assessment under hazardous substance regulations.

EXPOSURE STANDARDS

10.4 This sub-section should define and list the exposure standards relevant to the substance or any or all of its ingredients. If any approved codes of practice are available, these should be referenced.

10.5 The National Commission has approved national *Adopted Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:1003(1991)][5]. These exposure standards may be reviewed from time to time and therefore the most recent edition of this publication should be consulted. Further information on this publication is given in Appendix 1. (***See*** A1.4).

10.6 Australian exposure standards are to be used where they are allocated. Overseas exposure standards, for example, the threshold limit values of the American Conference of Governmental Industrial Hygienists, may be used where Australian exposure standards are not allocated. If there is no exposure standard allocated, then the MSDS should state that there is no exposure standard allocated.

10.7 Exposure standards represent airborne concentrations of individual chemical substances which, according to current knowledge, should neither impair the health of, nor cause undue discomfort to, nearly all workers. Exposure standards are generally expressed as a Time-Weighted Average (TWA) concentration of that substance over an eight-hour working shift, and apply to an

eight-hour day, for a five-day working week over an entire working lifetime. Where unusual work patterns, such as overtime, are adopted, caution should be exercised in the application of exposure standards.

10.8 Exposure standards are intended only for use as a guide in the control of potential health hazards. They should not be used to determine whether particular environments are safe or dangerous, as it is always good practice to reduce the concentration of all atmospheric contaminants to levels as low as practicable.

10.9 Where a notation of 'skin', 'sens', or categorisation of carcinogenicity appears against a particular exposure standard, the notation should be reproduced onto the MSDS and the notation suitably explained. Special consideration needs to be given to the application of exposure standards for mixtures. A more detailed discussion of exposure standards can be found in the National Commission's publication *Adopted Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:1003(1991)][5] and *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:3008(1991)][16] (***see*** Appendix 1).

ENGINEERING CONTROLS

10.10 This sub-section should include all data required for the selection and utilization of engineering controls suitable for the hazardous substance. Engineering controls are those measures which are used to control exposure to chemical hazards. Engineering controls include:

(a) process modification to eliminate substances;

(b) segregation of processes from personnel by partition and/or distance;

(c) vessel containment controls;

(d) enclosure of sources of substances to the maximum extent possible;

(e) mechanical handling to reduce human contact with substances;

(f) capture of substances at source and their safe disposal with a local exhaust ventilation system; and

(g) for substances of low toxicity, dilution ventilation of the workplace.

10.11 The MSDS should outline those engineering controls that are appropriate for the recommended uses and applications of the substance. Particular engineering controls to be used in individual workplaces will need to be considered as part of workplace assessments under the hazardous substances regulations.

10.12 The 'Engineering Controls' sub-section should indicate whether special ventilation requirements are necessary, and specify which type, for example, 'use only in a well ventilated area', 'ensure ventilation is adequate to maintain air concentrations below exposure standards', 'use local exhaust ventilation', 'use only in an enclosed system' or 'use only in spray paint booth or enclosure'.

PERSONAL PROTECTION

10.13 Where other control measures cannot be implemented or fail, personal protection should be used to control exposure. This might assist in the engineering control or may be the only mode of exposure control.

10.14 Measures for personal protection should include protection for skin, eyes and the respiratory system. Where it is appropriate, recommendations should be made in a narrative form outlining the necessary equipment. For example, 'wear nitrile rubber gloves and apron when handling this material', 'wear chemical goggles', 'wear faceshield', 'wear dust mask' or 'wear air-line respirator'. This information may not be relevant for emergency services situations.

10.15 Special requirements may exist for gloves or other protective clothing to prevent skin exposure and, where relevant, this should be clearly stated, for example, 'protective gloves', is not sufficient whereas 'PVC gloves' or 'nitrile rubber gloves' would be. Similarly, eye protection, if required, should be described as general use industrial safety glasses or the appropriate specific requirements should be stated. In relation to respirators, vague information such as 'use approved face mask' is not acceptable whereas 'use approved half-face filter respirator suitable for organic vapours' would be acceptable.

10.16 Gloves and safety glasses recommended should comply with Australian Standards, or an equivalent approved by a Commonwealth, State or Territory authority. Respirators should comply with Australian Standard AS 1716 *Respiratory Protective Devices*[13] or an equivalent approved by a State or Territory authority and should be used in accordance with Australian Standard AS 1715 *Selection, Use and Maintenance of Respiratory Protective Devices*[15].

10.17 The 'Engineering Controls' and 'Personal Protection' sub-sections should address all the adverse health effects listed in the 'Health Effects' sub-section. For example, for substances which are toxic and are absorbed through the skin, advice should be given on the appropriate glove type to be worn and ventilation requirements should be given for substances which are inhalation hazards.

FLAMMABILITY

10.18 This sub-section should include information about the ventilation needed to prevent a build-up of vapour or gases, any need to avoid ignition sources and any special requirements, such as isolation, earthing of containers, flameproofing or flameproof fittings, to prevent flammability risks. If the substance does not present specific fire hazards, this should be stated, for example, 'not flammable under conditions of use'.

10.19 Examples of other statements for this sub-section are:

(a) 'earth all containers to reduce the possibility of sparks from static electricity';

(b) 'use in well ventilated area';

(c) 'do not use in confined space'; and

(d) 'do not use close to ignition sources'.

SAFE HANDLING INFORMATION

Storage and Transport:

Spills and Disposal:

Fire/Explosion Hazard:

11. SAFE HANDLING INFORMATION

STORAGE AND TRANSPORT

11.1 This sub-section should include all data required for the safe storage and transport requirements of the hazardous substance. Safe storage information may include:

(a) location or siting of store;

(b) details on the construction of the store, that is, fire separation distances, type of flooring, bunding and security;

(c) storage conditions, that is, ventilation, temperature conditions, protection from weather, sunlight and so on, and storage incompatibilities, that is, materials and conditions to avoid; and

(d) type of container/package.

11.2 Safe transport information should list:

(a) Dangerous Goods Class and subsidiary risk;

(b) any Commonwealth, State or Territory regulatory requirements;

(c) packaging information and correct shipping name; and

(d) any other special requirements (hazards such as shock sensitivity should be restated here, if necessary) relevant to transport.

11.3 Examples of statements for this sub-section are:

(a) 'no special storage or transport requirements necessary'; and/or

(b) 'must be stored in flammable goods stores complying with Commonwealth, State or Territory regulations'.

SPILLS AND DISPOSAL

Spills

11.4 This sub-section should contain:

(a) steps to be taken to minimise a spill or leak;

(b) methods used to clean up the spill or leak, for example, 'neutralising agent or absorbent';

(c) precautions to be observed by the clean up crew, for example, 'remove all ignition sources - wear .... masks'; and

(d) any special equipment required for clean up.

11.5 In this sub-section, information on methods to be used to clean up a spill or a leak and precautions to be taken by the clean-up crew is considered essential.

11.6 Recommendations for small and large spills should be distinguished from each other.

11.7 Some examples of statements for this sub-section are:

(a) 'for small spills, wash with plenty of water';

(b) 'for large spills, neutralise with sodium bicarbonate'; and

(c) 'contain spill with absorbent material such as sand or vermiculite'.

Disposal

11.8 This sub-section should contain specific recommendations on:

(a) disposal containers;

(b) disposal method;

(c) the need to check local statutory requirements; and

(d) special precautions for incineration or landfill.

11.9 In this sub-section, recommendations on disposal methods is considered essential. Disposal into sewerage systems should be discouraged.

11.10 Recommendations for small and large-scale disposals should be distinguished from each other.

FIRE/EXPLOSION HAZARD

11.11 This sub-section should contain information for fire fighting and emergency services. It is not necessary to word it in lay terms.

11.12 Fire or explosion hazards under any reasonably foreseeable conditions of use or storage should be defined and any dangerous decomposition or combustion products listed. Decomposition products are those which form on the breakdown of a product due to various factors. Combustion products occur only when a product is subject to burning.

11.13 Examples of statements for this sub-section are:

(a) 'decomposes to toxic fumes of phosgene and hydrogen chloride';

(b) 'may produce toxic fumes of carbon monoxide if burning in confined space'; and

(c) 'produces oxides of sulphur and nitrogen on combustion'.

11.14 Recommendations for fighting fires, including types of extinguishers or fire-fighting agents, precautions to be observed and protective clothing to be worn by firefighters should be included. Any potentially dangerous interaction with other substances should be included. Entering the Hazchem Code provides a good way of detailing this information.

12. OTHER INFORMATION

12.1 This section should include any other relevant information available on the substance not specified in other sections. Examples of information which may be included are:

(a) animal toxicity data;

(b) ecotoxicity data;

(c) biodegradability; and

(d) persistence in soil or water.

13. CONTACT POINT

13.1 MSDS should provide specific information in this area, statements such as 'contact local authority' are of little or no use. The contact point should direct a caller to a nominated person who can clarify information or provide further information and/or a bibliography. The contact point should not be a general switchboard number. The title of a position or section should be inserted here, for example, 'Technical Manager (02) 369 2468', or 'Technical Services Information Officer (03) 123 4567 Ext 890'. There should always be a contact point that is in Australia.

APPENDIX 1

INFORMATION SOURCES RELEVANT TO THE PREPARATION OF MATERIAL SAFETY DATA SHEETS

A1.1 The following information sources, which are described in this appendix, are useful when compiling MSDS:

(a) standards and government publications;

(b) books, monographs and other publications;

(c) microfiche collections of information; and

(d) computer databases.

A1.2 They provide information on individual chemicals or groups of chemicals, chemical processes, safe handling and emergency procedures. Latest editions should always be used.

STANDARDS AND GOVERNMENT PUBLICATIONS

Australian Publications

A1.3 National Occupational Health and Safety Commission, *Control of Workplace Hazardous Substances: National Model Regulations* [NOHSC:1005(1994)][1] *and National Code of Practice* [NOHSC:2007(1994)][13], Australian Government Publishing Service, Canberra, 1993.

> The *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)][1] set out the matters to be adopted in regulations to State/Territory occupational health and safety legislation to provide a nationally consistent approach. The national model regulations apply to all workplaces and to all persons with a potential for exposure to a hazardous substance. One of the main components of the national model regulations is the provision of information. Under the national model regulations, it is the manufacturer or importer of a hazardous substance who must produce a MSDS and provide to downstream suppliers. It is the employer's obligation to make this information accessible to employees.

A1.4 National Occupational Health and Safety Commission, *Adopted Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:1003(1991)][5] and *Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment* [NOHSC:3008(1991)][16], (Australian Government Publishing Service, Canberra, 1991.)

> Presently this document lists Australian exposure standards for approximately 650 substances and will be revised regularly.

A1.5 National Occupational Health and Safety Commission, *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)][3], (Australian Government Publishing Service, Canberra, 1993.) This document details the criteria for determining whether a substance is a hazardous substance. The national model regulations require that MSDS are produced for all substances meeting this criteria.

A1.6 National Occupational Health and Safety Commission, *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2012(1994)][12], (Australian Government Publishing Service, Canberra, 1993.)

The aim of this code of practice is to provide practical guidance on meeting the requirements for the labelling of substances used at work under the *National Model Regulations for the Control of Workplace Hazardous Substances*[1] and a minimum standard for the labelling of all substances used at work. It details labelling requirements for workplace substances in harmony with existing labelling systems in Australia.

A1.7 National Occupational Health and Safety Commission, Worksafe Australia Guide Series, Australian Government Publishing Service, Canberra.

This series includes guides on selected chemicals and groups of chemicals. Titles include *Arsenic and Arsine* [NOHSC:5011(1989)], *Cyanide Poisoning* [NOHSC:5009(1989)] and *Hydrogen Fluoride* [NOHSC:5001(1989)] in addition to more general issues such as *Atmospheric Contaminants* [NOHSC:5008(1989)], *Occupational Diseases of the Skin* [NOHSC:5013(1990)], *Electroplating* [NOHSC:5005(1989)], *Isocyanates* [NOHSC:5012(1990)], *Solvent Vapour Degreasing* [NOHSC:5007(1989)], *Industrial Organic Solvents* [NOHSC:5014(1990)], *Foundry Health Hazards* [NOHSC:5002(1989)] and *Prevention of Eye Damage* [NOHSC:5010(1989)]. Guides cover identification, health effects, hazard management, safe working and emergency procedures.

A1.8 National Industrial Chemical Notification and Assessment Scheme, *Summary Reports*.

These reports are available in the Commonwealth Gazette, for every substance notified and assessed under the *Industrial Chemical (Notification and Assessment) Act 1989*, Cwlth.

They contain information resulting from national assessment, including the chemical's general uses, precautions and restrictions to be observed during manufacture, handling, storage, use and disposal, emergency procedures and summary health and environmental effects data.

A1.9 *Australian Code for the Transport of Dangerous Goods by Road and Rail*, of Australia, Australian Government Publishing Service, Canberra, 1992.

This Code is prepared by the Standing National Advisory Committee on the Transport of Dangerous Goods. The Code is based on recommendations prepared by the United Nations Committee of Experts on the Transport of Dangerous Goods. It is designed to apply to all surface land transport in Australia and has been prepared to ensure compliance with the requirements for transport by sea from Australian ports.

The publication consists of a description of the detailed criteria for the classification of dangerous goods, requirements for the marking of packages, vehicles and transport containers, packaging for dangerous goods, transport in bulk and the procedures for the transport of dangerous goods, together with an index of dangerous goods. This index provides the UN number, Dangerous Goods Classification, Hazchem Code, correct shipping name and general information on the properties of the classified substances.

A1.10 National Health and Medical Research Council, *Pesticides, Synonyms and Chemical Names*, Australian Government Publishing Service, Canberra, l987.

This publication, prepared by the Commonwealth Department of Health provides common names, trade names and chemical names for a large number of pesticides.

A1.11 National Health and Medical Research Council, *Standard for the Uniform Scheduling of Drugs and Poisons*, Australian Government Publishing Service, Canberra, 1992.

The standards are the recommendations of the National Health and Medical Research Council, acting upon the advice of its Drugs and Poisons Schedule Committee. The publication provides a listing of the substances in each Schedule, recommended warning and safety directions for labels, together with general information about the interpretation of schedule entries.

A1.12 Standards Australia, Australian Standards, Standards Australia, Sydney. Standards Australia publishes a number of publications which are useful when compiling a MSDS.

These include:

· AS 1000 *The International System of Units (SI) and its Application*, Sydney;

· AS l2l6 *Classification, Hazard Identification and Information Systems for Dangerous Goods*, Sydney:

Part 1 - *Classification and Class Labels for Dangerous Goods*, and Parts 2 to 4 (bound together), comprising:
- Part 2 - *Hazchem Emergency Action Code*,
- Part 3 - *NFPA Hazard Identification System*, and
- Part 4 - *UN Substance Identification Numbers*;

· AS 1678 *Emergency Procedure Guide - Transport* (various guides on selected chemicals), Sydney;

· AS l7l5 *Selection, Use and Maintenance of Respiratory Protective Devices*, Sydney;

· AS 1716 *Respiratory Protective Devices*, Sydney;

· AS 2106 *Methods for the Determination of the Flashpoint of Flammable Liquids (Closed Cup)*, Sydney;

· AS 2l6l *Industrial Safety Gloves and Mittens (Excluding Electrical and Medical Gloves)*, Sydney;

· AS 3765 *Clothing for Protection Against Hazardous Chemicals, Part 1 - Protection Against General or Specific Chemicals*, Sydney; and

· AS 3765 *Clothing for Protection Against Hazardous Chemicals Part 2 - Limited Protection Against Specific Chemicals*, Sydney.

A full list of standards is available from Standards Australia, 1 The Crescent, HOMEBUSH NSW 2140 or from PO Box 1055, STRATHFIELD NSW 2135.

A1.13 Pocket, that is, wallet-sized plastic cards giving details of the Hazchem Code are available from a number of chemical industry companies and fire brigades.

Overseas Government Publications

A1.14 National Institute for Occupational Safety and Health, NIOSH *Pocket Guide to Chemical Hazards*, DHHS (NIOSH) Publication No. 85-114, National Institute for Occupational Safety and Health, US Government Printing Office, Washington, DC, USA, February 1987.

> This pocket guide contains information on over 400 chemicals and is derived from the NIOSH/OSHA Occupational Health Guidelines. It includes information on chemical names and formulas, synonyms, exposure standards, physical and chemical properties (for example, explosive limits and incompatibilities), personal protection, symptoms of exposure, target organs and first aid.

A1.15 National Institute for Occupational Safety and Health, *Registry of Toxic Effects of Chemical Substances*, Volumes 1, 2 and 3, NIOSH Publication No. 81-116, National Institute for Occupational Safety and Health, US Government Printing Office, Washington, DC, USA, 1982. Available in hard copy, microfiche or on several computer databases and on compact discs such as CCINFO and CHEM-BANK.

> This information source is discussed under RTECS, in the section on computer databases later in this appendix.

A1.16 NIOSH/OSHA, *Occupational Health Guidelines for Chemical Hazards*, DHHS (NIOSH) Publication No. 81-123, National Institute of Occupational Safety and Health, US Government Printing Office, Washington, DC, USA, January 1981. (***See*** sub-appendix A1.14).

> These guidelines contain the same sort of information as in the OSHA Pocket Guide but in greater detail.

A1.17 US Department of Health and Human Services, Public Health Service, *National Toxicology Program, Fourth Annual Report on Carcinogens*, US Department of Health and Human Services, 1985, updated regularly.

> This report gives a list of chemicals classified as carcinogens by the National Toxicology Program. Available from US Department of Health and Human Services, 200 Independents Avenue, SW, Washington DC, 20201, USA.

BOOKS, MONOGRAPHS AND OTHER PUBLICATIONS

ACTU Health and Safety Bulletins

A1.18 A number of titles are available providing information on chemical hazards. These include Hazard Alerts, for example *2-Nitropropane*, *Pentachlorophenol and Glycol Ethers*, and *Guidelines for Working with Solvents.*

A1.19 A full list of titles and copies of publications are available from ACTU/VTHC Occupational Health and Safety Unit, Box 93, Trades Hall, CARLTON SOUTH VIC 3053.

Other Publications

A1.20 Berger, M., *Hazardous Substances: A Reference*, Enslow Publishers, Inc, Hillside, USA, 1986.

This is a dictionary-like guide to over 230 dangerous materials.

A1.21 Clayton, G.D., Clayton, F.E., *Patty's Industrial Hygiene and Toxicology*, Volumes 1, 2A, 2B, 2C, 3A and 3B, John Wiley and Sons, New York, USA, 1991.

Volume 1 covers general principles and volumes 3A and 3B, the theory and rationale of industrial hygiene practice. Volumes 2A, 2B and 2C cover the toxicology of classes of chemicals, uses and industrial experience, physical and chemical properties, analytical methods and acute and chronic toxicity data related to both animals and humans.

This is a useful reference source providing detailed information. Patty's is becoming a little dated now but still represents the most comprehensive source of information on industrial chemicals.

A1.22 Ellenhorn, M.J. and Barceloux, G., *Medical Toxicology: Diagnosis and Treatment of Human Poisoning*, Elsevier, New York, USA, 1987.

This book provides information necessary to evaluate and treat the clinical effects of toxic substances. It has sections on drugs, drugs of abuse, chemical products, including alcohols, airborne toxins, household products, hydrocarbon products, ethers, ketones, pesticides and metals. A very useful reference source for information on first aid and medical treatment.

A1.23 Finkel, A.J., Hamilton, A. and Hardy, H.L., *Hamilton and Hardy's Industrial Toxicology*, Fifth Edition, John Wright PSG Inc, Massachusetts, USA, 1991.

This text deals in a general way with the industrial toxicology of metals, dusts, organic high polymers, pesticides and other chemical compounds.

A1.24 Gosselin, R.E., Smith, R.P. and Hodge, H.C., *Clinical Toxicology of Commercial Products: Acute Poisoning*, 5th Edition, Williams and Wilkins, Baltimore, USA, 1984.

This book provides toxicological information including an appraisal of toxicity of individual ingredients in commercial products.

A1.25 Hawley, G.G., *The Condensed Chemical Dictionary*, Van Nostrand Reinhold, New York, USA, 1992.

This is a dictionary of chemical data and descriptive information covering many thousands of chemicals and chemical phenomena. Provides information on synonyms.

A1.26 International Agency for Research on Cancer, *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Humans*, Volumes 1-52, International Agency for Research on Cancer, Lyon, France, 1972-1987.

These monographs are critical reviews of the literature on chemicals, industrial processes and industries associated with human cancer by the various IARC Working Groups.

A1.27 International Agency for Research on Cancer, *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, Supplement 4, Chemicals, Industrial Processes and Industries Associated with Cancer in Humans* (IARC Monographs, Volumes 1 to 29), International Agency for Research on Cancer, Lyon, France, 1982.

This publication is a report of an IARC ad hoc Working Group to advise the Director, IARC, on chemicals, industrial processes and industries that are carcinogenic to humans. The supplement summarises the data reviewed in the IARC Monographs, Volumes 1 to 29, and provides a cumulative index.

A1.28 International Agency for Research on Cancer, *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans*, Supplement 7 (IARC Monographs, Volumes 1 to 42), International Agency for Research on Cancer, Lyon, France, 1987.

Supplement 7 is an update of Supplement 4.

A1.29 International Agency for Research on Cancer, *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, Supplement 6 (Genetic and Related Effects: An Updating of Selected IARC Monographs, Volumes 1 to 42)*, International Agency for Research on Cancer, Lyon, France, l987.

This is a tabulation of the published literature on the genotoxic effects of 200 IARC evaluated chemicals and agents.

A1.30 International Labour Office, *Encyclopedia of Occupational Health and Safety*, Volumes 1 and 2, International Labour Office, Geneva, Switzerland, 1983.

The two volumes of this encyclopaedia are very good sources for information on safety and manufacturing processes but are not orientated toward specific chemicals.

A1.31 International Programme on Chemical Safety, *Environmental Health Criteria 1-81*, World Health Organization, Geneva, Switzerland, 1976-1988.

These criteria are reviews of environmental and toxicological literature on chemicals and physical agents published as a joint venture of the United Nations Environment Programme, the International Labour Organisation and the World Health Organization.

A1.32 Klaasen, C.D., Amdur, M.O. and Doull, J., *Casarett and Doull's Toxicology: The Basic Science of Poisons*, Macmillan Publishing Company, New York, USA, 1991.

This is a text book covering theoretical aspects of toxicology including concepts and mechanisms.

A1.33 Lefevre, M.J. and Becker, E.I., *First Aid Manual for Chemical Accidents*, Van Norstrand Reinhold, New York, USA, 1982.

This is an easily readable, handily indexed source book aimed at the first aider providing first aid at the workplaces in which industrial chemicals are used.

A1.34 Lenga, R.E. (Ed), *The Sigma-Aldrich Library of Chemical Safety Data*, Sigma-Aldrich Corporation, Milwaukee, USA, 1985.

An alphabetical sequence of over 7,000 chemicals containing brief descriptions of toxicity, health hazards, first aid, incompatibilities, handling, storage and disposal.

A1.35 Merck and Company Incorporated, *The Merck Index*, 11th Edition, Merck and Company, Rahway, USA, 1989.

The Merck Index contains information on a huge number of industrial chemicals, drugs, pesticides and biological compounds. Information on these chemicals is fairly limited and consists of nomenclature, formula, routes of preparation and CAS registry numbers.

A1.36 Procter, N.H., *Chemical Hazards of the Workplace*, J.P. Lipincott Company, New York, USA, 1991.

This is a good general book covering workplace chemical safety. It does not deal with specific chemicals, but groups of chemicals.

A1.37 Sax, N.I. and Lewis, Sr. R.J., *Dangerous Properties of Industrial Materials*, Volumes 1, 2 and 3, Van Nostrand Reinhold, New York, USA, 1992.

Volume 1 contains textual material on toxicology, industrial and environmental cancer risks, and genetic toxicology. Volumes 2 and 3 contain approximately 20,000 chemicals listed alphabetically. The book concentrates on physical hazards and acute toxicity, with less emphasis on chronic toxicity. CAS registry numbers are provided together with synonyms.

A1.38 Sax, N.I. and Lewis, Sr. R.J., *Rapid Guide to Hazardous Chemicals in the Workplace*, Van Nostrand Reinhold, New York, USA, 1990.

This is a rapid reference source and a useful adjunct to Dangerous Properties of Industrial Materials (***see*** above). The text contains abstracted information from the above publication on nearly 700 materials which have workplace recommendations in the USA.

A1.39 Schardein, J.L., *Chemical Induced Birth Defects*, Marcel Dekker, New York, USA, 1993.

This is a valuable reference text on chemicals and their interaction with the processes of development and growth.

A1.40 Shepard, T.H., *Catalogue of Teratogenic Agents*, 7th Edition, Johns Hopkins University Press, Baltimore, USA, 1992.

This is a comprehensive listing of teratogens, as abstracted from the published literature.

A1.41 Sittig, M., *Handbook of Toxic and Hazardous Chemicals and Carcinogens*, Noyes Publications, New Jersey, USA, 1991.

This handbook presents concise chemical, health and safety and waste disposal information including potential exposure, routes of entry, incompatibilities, exposure standards and first aid information.

A1.42 Weiss, G., *Hazardous Chemicals Data Book*, Noyes Publications, New Jersey, USA, 1986.

This handbook contains information on 1,015 hazardous chemicals. It is aimed mainly at personnel involved in handling of hazardous chemical materials and related accidents. It is a useful reference source.

A1.43 Wexler, P., *Information Resources and Toxicology*, Second Edition, Elsevier, New York, USA, 1987.

This is a succinct guide to major sources of toxicological information. It contains a selective and annotated list of information resources.

A1.44 The Chemical Rubber Company, *Handbook of Chemistry and Physics*, 68th Edition, CRC Press, Boca Raton, USA, 1987-1988.

This handbook provides detailed physical and chemical data including molecular formula, and boiling points on both inorganic and organic chemicals. It does not contain any information about toxicity or occupational health and safety.

MICROFICHE COLLECTIONS OF INFORMATION

ACEL Occupational Health and Safety Index

A1.45 This service provides access to over 200,000 pages of material on a wide range of occupational health and safety information. Material is drawn predominantly from the English Barbour system but it now publishes a number of Australian contributions, including those of the National Commission and Standards Australia. Entire documents are included.

A1.46 Available from ACEL Information Services:

98 Arthur Street
NORTH SYDNEY
PO Box 1040
NORTH SYDNEY NSW 2059

71 Queens Road
MELBOURNE 3004
PO Box 2014
WEST ST KILDA VIC 3182

178 Cane Street
REDLAND BAY QLD 4165

Material Safety Data Sheet Service

A1.47 This service provides copies of MSDS written by manufacturers. It is an American service and therefore MSDS are predominantly of American origin. No validation of the MSDS is carried out before entry onto the service.

A1.48 Available from:

VSMF Data Control Service
Information Handling Services
Inverness Business Park
I5 Inverness Way East
PO Box ll54
ENGLEWOOD
COLORADO 80150 USA

COMPUTER DATABASES

A1.49 There are two principal types of computer databases available:

(a) factual - a listing of information on the properties of a chemical, for example, RTECS and TOXNET; and

(b) bibliographic - a list of references in the scientific literature, for example, CA-online, CISDOC, HSELINE, MEDLINE and NIOSHTIC.

A1.50 Factual databases have the advantage of allowing immediate access to information, for example, specific physical properties of a chemical or its CAS Number. It is not always possible to retrieve this information by searching a bibliographic database because copies of the relevant article have to be obtained from journals and books and this process can be very time consuming. However, it should be noted that reference to articles in the scientific literature will generally provide more current information in a greater amount of detail.

A1.51 Searching databases containing chemical information demands a knowledge and experience of the different search techniques. Searching by inexperienced users can be very expensive and yield results which may not be a true representation of the information available. Advice from an experienced user should be sought before commencing a search.

A1.52 The databases listed below may be accessed through various database suppliers, for example, Insearch-Dialog, Orbit and the National Library of Australia. These different suppliers vary in the charges made for access and in the way searches are carried out.

A1.53 There are an increasing number of compact discs becoming available containing databases. For the inexperienced or frequent user these provide a far more cost effective access. This is because once the disc is purchased no charge is made for access. This is in contrast with on-line databases where charges are made for every minute the user is connected to the database, the number of records viewed or printed and also an annual subscription fee.

Australian Databases

A1.54 These databases, which are being developed within Australia, are particularly orientated towards the Australian marketplace. There are several such databases, chiefly providing factual information for emergency services. Australian databases include Worksafe Australia's CD-ROM product WORKSAFE-DISC, and Datachem and Toxichem which are described below.

A1.55 WORKSAFE-DISC contains the:

(a) National Material Safety Data Sheet Repository;

(b) Australian atmospheric contaminants exposure standards;

(c) Australian and New Zealand Occupational Health and Safety Bibliographic Database;

(d) NIOSHTIC, the scientific and bibliographic database from the US National Institute of Occupational Safety and Health; and

(e) RTECS, the registry of toxic effects of chemical substances from the US National Institute of Occupational Safety and Health.

A1.56 WORKSAFE-DISC is available by subscription from Worksafe Australia. It is updated on a quarterly basis.

A1.57 ACIC Datachem is a database of some 80,000 chemicals including synonyms and trade names. Its target market is chemical incident first responders and is used by most Australian Fire Services and by Fire Services in more than twenty countries around the world. Information is supplied by chemical manufacturers and the database is updated by the National Chemical Emergency Centre, a division of the United Kingdom Atomic Energy Authority. It is supported in Australia by Michael Dewhirst and Associates Pty Ltd by agreement with the Australian Chemical Industry Council. It is available by subscription and runs on personal computers.

A1.58 Toxichem is another emergency services database providing chemical response information, and has been developed by the Western Australian Fire Brigades Board from a survey of chemical products in use in Western Australia. Currently Toxichem contains about 40,000 entries and, although information is only available on emergency services procedures for the purpose of emergency response, the software has the potential to add on other information.

International Databases

A1.59 There are currently over 300 databases providing occupational health and safety information. Some of the more widely used databases providing information on chemicals are described below.

A1.60 CCINFO: This database is provided only on compact disc (CD-ROM) by the Canadian Centre for Occupational Health and Safety (CCOHS).

A1.61 The database is currently provided on a series of six compact discs comprising:

(a) Series A containing Chemical Information (two discs);

(b) Series B (two discs); and

(c) Series C (two discs) containing OHS Information.

A1.62 *Series A Chemical Information* which includes the following databases: TRADE NAMES (Material Safety Data Sheets on Canadian Trade Name Products), CHEMINFO (information on pure chemicals, natural substances and mixtures, compiled by CCOHS staff).

A1.63 *Series B Occupational Health and Safety Information*: includes information on Canadian and international research, noise levels, fatality reports.

A1.64 Series C contains occupational health and safety information from RTECS (computerised version of the United States National Institute of Occupational Safety and Health's Registry of Toxic Effects of Chemical Substances) and NIOSHTIC (bibliographic database with international coverage created by the US National Institute of Occupational Health and Safety).

CCINFO DISK can be obtained directly from:

Canadian Centre for Occupational Health and Safety
250 Main Street
East Hamilton
Ontario, L8N 1H6
CANADA
Phone: (416) 572 4429 or 1 800 668 4284

A1.65 CHEMBANK: This database contains four separate databases:

(a) RTECS - *Registry of Toxic Effects of Chemical Substances* (***see*** under RTECS later in this appendix);

(b) CHRIS - *Chemical Hazard Response Information System* from the US Department of Transportation (coastguard) contains information to assist with emergency response, accident response, accident prevention and safety procedure design, and transportation of chemicals; and

(c) OHMTADS - *Oil and Hazardous Materials - Technical Assistance Data System* from the US Environmental Protection Agency holds numerical data and interpretative comments to help in response to emergency spills.

(d) HSDB - *Hazardous Substance Data Bank* from the US National Library of Medicines TOXNET system, is a factual, non-bibliographic databank focussing on the toxicology of potentially hazardous chemicals. Is is enhanced with data from such areas as emergency handling procedures, impact on environment, detection methods and US regulatory requirements. HSDB data are reviewed before entry.

A1.66 *CHEMBANK* is available on compact disc and is available from:

Silver Platter Information Services
Australian Agent
Aldis Pty Ltd
Private Bag No 16
PORT MELBOURNE VIC 3207

A1.67 *CHEMICAL ABSTRACTS* (CA-Online or CA-Search): This database, which is named differently by different suppliers, corresponds to the hard copy Chemical Abstracts produced by the American Chemical Society. Chemical Abstracts cover the whole literature of chemistry.

A1.68 The database is bibliographic and includes references to world wide literature. The database is the principal store of CAS Nos. The database is particularly good for checking CAS Nos and chemical nomenclature data on individual chemicals, and obtaining patent information. Abstracts are not provided on the database and therefore it is always necessary to go to the hard copy chemical abstracts to find out more information and then the original journal article. CAS Nos can be obtained immediately from a chemical dictionary file. It is the most comprehensive chemical database in existence containing information on over seven million chemicals. Chemical Abstracts is available on several host computer systems including INSEARCH-DIALOG and ORBIT. Costs of accessing the database vary.

A1.69 *MEDLINE*: This database is produced by the United States National Library of Medicine. It contains references to journals covering all aspects of medicine and is particularly useful for any searches involving a specific toxic effect, toxicity in humans and older on-line material CAS registry numbers are included on the database and allow for easier chemical searching. The database is available on many host systems and through the National Library of Australia. It is also available on compact disc.

A1.70 *OSHROM*: OSHROM is a compact disc comprising the following 3 databases:

(a) CISDOC;

(b) HSELINE; and

(c) NIOSHTIC.

A1.71 OSHROM is available through Aldis Pty Ltd, Private Bag No 16, PORT MELBOURNE VIC 3207.

A1.72 *CISDOC*: This database is produced by the International Occupational Safety and Health Information Centre (CIS) as a unit of the International Labour Office, Geneva, Switzerland. The database contains bibliographic information relevant to occupational health and safety, CIS Abstracts, and information on industrial toxicology and hygiene, and chemical hazards. All articles are abstracted. The database is available on-line or on compact disc (OSHROM, CCINFO).

A1.73 *HSELINE*: This database is produced by the United Kingdom Health and Safety Executive and is aimed at anyone who is seeking information on occupational health and safety. The database contains over 80,000 records on subjects which reflect HSE's interests including industrial toxicology and hygiene and chemical hazards. There is some overlap in content with NIOSHTIC and CISILO. The database is available on-line through different hosts and compact disc (OSHROM, CCINFO).

A1.74 *NIOSHTIC*: This database is produced by the US National Institute of Occupational Safety and Health (NIOSH). It contains over 130,000 references to research reports and information which is expected to contribute to the understanding of OHS problems. The database contains references to all aspects of occupational safety and health dating back to 1900. The database is available on-line through several host databases and on compact disc (CCINFO, OSHROM). This database will also be available on WORKSAFE-DISC and WORKSAFE-LINE.

A1.75 *RTECS*: This database is produced by the US National Institute of Occupational Safety and Health. It contains data on over 90,000 chemicals including CAS Nos, chemical nomenclature, formulae, and synonyms. Toxicity data included on the database include acute and chronic animal test data, human data, skin and eye irritation data, TLVs, IARC determinations, *in-vitro* toxicity test data, US National Toxicology Programme (NTP) and *Toxic Substances Control Act* (TSCA) Chemical Substances Inventory data[16]. The data provided is often difficult to decipher as a complex system of abbreviation is used.

A1.76 The data included on the database is not always assessed for validity before entry and therefore caution is necessary before use. Bibliographic references are provided and so copies of the original articles may be obtained to follow up or check the information provided.

A1.77 RTECS is available in the following forms:

(a) on compact discWORKSAFE-DISC, CCINFO, CHEMBANK;

(b) on-line TOXNET;

(c) on microfiche Available by quoting US Stock number 017-033-00431-5 to any library supplier including INFOLINE Overseas Documents GPO Box 506, SYDNEY NSW 2001; and

(d) as hard copy.

A1.78 *TOXNET*: This database is produced by the United States National Library of Medicine. The database contains information on over 4,000 chemicals including chemical nomenclature and CAS Numbers, manufacturing information, uses and processes, chemical and physical properties, safe handling information, fire hazards and hazardous reactions, toxic effects in humans and animals, emergency treatment, pharmacology, exposure limits, analytical and monitoring methods. All data are reviewed for validity before entry.

A1.79 Available on-line through the National Library of Australia. For further information call OZLINE (06) 262 1215.

A1.80 *TOMES PLUS* is a new title produced by Micromedev which offers a wide choice of chemical files for searching including RTECS, HSDB, OHM/TADS, CHRIS together with:

(a) MEDITEXT: evaluation and treatment of individuals exposed to chemicals.

(b) HAZARDTEXT: response to incidents involving hazardous materials.

(c) SARATEXT: acute/chronic effects of hazardous substances; assists with SARA Title III medical reporting requirements.

(d) INFOTEXT: regulatory listings and general information documents.

(e) REPRORISK: reproductive risk data about effects of chemicals and environmental agents.

(f) IRIS: from EPA; risk assessments for over 450 chemicals.

(g) DOT Emergency Response Guides: initial response to fires, explosions and releases.

(h) 1st Emergency Response Protocols: emergency response to workplace illness and injury.

(i) New Jersey Hazardous Substances Fact Sheets: (from New Jersey Department of Health), described as employee oriented exposure risk information for over 700 hazardous substances.

TOMES PLUS is available from:

Hinton Information Services
10 East Parade
Locked Bag 7
EASTWOOD NSW 2122

APPENDIX 2

MATERIAL SAFETY DATA SHEET - RECOMMENDED FORMAT

Page *x* of Total *y*
Date of Issue:

COMPANY DETAILS

Company:
Address:
Telephone Number:
Emergency Telephone Number:

STATEMENT OF HAZARDOUS NATURE

IDENTIFICATION

Product Name:
Other Names:
Manufacturer's Product Code:
UN Number:
Dangerous Goods Class and Subsidiary Risk:
Hazchem Code:
Poisons Schedule number:
Use:

Physical Description/Properties
Appearance:
Boiling Point/Melting Point:
Vapour Pressure:
Specific Gravity:
Flashpoint:
Flammability Limits:
Solubility in Water:

Other Properties:

Ingredients
Chemical name: CAS Number: Proportion:

HEALTH HAZARD INFORMATION

Health Effects
Acute:
Swallowed:
Eye:
Skin:
Inhaled:

Chronic:

First Aid
Swallowed:
Eye:
Skin:
Inhaled:
First Aid Facilities:

Advice to Doctor:

PRECAUTIONS FOR USE

Exposure Standards:
Engineering Controls:
Personal Protection:
Flammability:

SAFE HANDLING INFORMATION

Storage and Transport:
Spills and Disposal:
Fire/Explosion Hazard:

OTHER INFORMATION:

CONTACT POINT:

APPENDIX 3

HAZCHEM CODE

A3.1 The Hazchem Emergency Action Codes (commonly known as Hazchem Codes) are designed to provide coded information on the fire fighting medium to be used, clothing and equipment for personal protection, the risk of violent reaction or explosion, spillage action and whether evacuation should be considered, in the event of an incident with a substance which is a dangerous good.

A3.2 The *ADG Code*[4] is the primary source of Hazchem Codes for use in Australia and each substance in Section 9.4 of that code is allocated a Hazchem Code. The Hazchem Codes were developed in the United Kingdom. Reference should be made to Section 9 of the *ADG Code*[4] when a Hazchem Code is required for a substance. It should be noted that if a substance is not listed by name, it may be covered by a N.O.S. (not otherwise specified) entry and reference to the classification criteria in Section 2 of the *ADG Code*[4] may be required. Substances which are not dangerous goods do not have Hazchem Codes.

A3.3 Hazchem Codes consist of a numeral followed by either one or two letters and are to be used in conjunction with the explanation in the "Interpretation" of the Hazchem Emergency Action Code contained in the *ADG Code*[4]. The numerals indicate the fire fighting medium to be used and they range from, 1 water jets; 2 water fog; 3 foam and 4 dry agent. The first letter denotes whether there is danger of violent reaction or explosion, the protective equipment required and the measures to be taken in the case of spillage. Some of the letters are contained in a box and are reversed out from a black background. The reversed letters indicate that no toxic hazard will arise if it is a non-fire incident, for example, where a spillage only has taken place. The second letter is Code E and is used to indicate if evacuation may need to be considered by the emergency authorities.

A3.4 An example of a Hazchem Code is 2[Y]E allocated to methyl ethyl ketone. This Hazchem Code specifies:

2 the use of water fog as the extinguishing media;

[Y] the protective equipment required, spillage is to be retained and as Y is reversed, there is no toxic hazard unless the substance is on fire; and

E evacuation may need to be considered.

It should be noted that the use of a fire fighting medium having a higher number than that in the Hazchem Code is allowed but, fire fighting mediums having lower numbers [4]are not to be used.

A3.5 Reference should be made to Section 9 of the *ADG Code*[4] for further information on the Hazchem Emergency Action Code system.

APPENDIX 4

CAS REGISTRY NUMBERS

A4.1 The CAS Registry Number (CAS No) is a number assigned by the United States Chemical Abstracts Service[6] to identify a chemical. The CAS Number contains from 5 to 9 digits separated into three groups by hyphens. The first group, starting from the left, has up to 6 digits; the second group always has 2 digits; the third group always has l digit.

A4.2 The CAS Number is specific for single chemicals and for some mixtures. However, a CAS Number may also be assigned based on refining processes such as for petroleum products, or for a group of similar compounds, such as polymers of varying molecular weight, but for certain other substances which are not highly defined. The CAS Number should be the most current one for the substance.

A4.3 Examples of CAS Numbers are:

(a) formaldehyde (50-00-0);

(b) benzene (7l-43-2);

(c) calcium oxide (l305-78-8);

(d) chromic sulphate (l0l0l-53-8); and

(e) polypropylene (9003-07-0).

SOURCES OF CAS NUMBERS

A4.4 CAS Numbers may be obtained either from the hard copy Chemical Abstracts or from its database, CA Search-online, which is a user-pays system. Occasional or small users can gain access to databases via their trade or industry association, their trade union or a technical library, for example, at a university or college of advanced education.

A4.5 CAS Numbers may also be obtained from:

(a) the *Australian Inventory of Chemical Substances* (AICS)[18] now available on microfiche and in hard copy;

(b) the *Toxic Substances Control Act (TSCA) Chemical Substances Inventory* compiled by the United States Environmental Protection Agency and available both in hard copy form and on computer database through Dialog (R) Information Retrieval Service;

(c) the European Economic Community's *European Inventory of Existing Commercial Chemical Substances (EINECS)*[19] available in hard copy and on database; and

(d) various databases, for example, *TOXNET* - National Library of Medicine; *NIOSH - Pergamon Info Line* and *THE MERCK INDEX ONLINE - Dialog (R) Information Retrieval Service*.

A4.6 Other sources of CAS Numbers are:

(a) *International Chemical Buyers Directory*, ed. Derz, F.W., Walter de Gruyten, Berlin - New York, USA, l976;

(b) *Aldrich Catalog - Handbook of Fine Chemicals*, Aldrich Chemical Company Inc, Wisconsin, USA, 1988;

(c) *Heilbron's Dictionary of Organic Compounds*, 5th Edition, Chapman and Hall, UK, 1982;

(d) *Merck Index* (***see*** Appendix 1, A1.35 for details);

(e) *Dangerous Properties of Industrial Materials*, Volumes 1, 2 and 3 (***see*** Appendix 1, A1.37 for details); and

(f) *NIOSH RTECS* - hard copy, microfiche or on computer (***see*** Appendix 1, A1.74 for details).

A4.7 Further assistance on a fee for service basis can be obtained from the following reference centres.

New South Wales

Macquarie University Library
NORTH RYDE NSW 2109
Phone (02) 805 7566

University of New South Wales
Physical Sciences Library
PO Box 1 KENSINGTON NSW 2033
Phone (02) 697 2653

Fisher Library
University of Sydney
SYDNEY NSW 2006
Phone (02) 692 3257

Information Edge
State Library of New South Wales
Level 10, Macquarie Street
SYDNEY NSW 2000
Phone (02) 230 1439

The Library, Worksafe Australia
92 Parramatta Road
CAMPERDOWN NSW 2050
Phone (02) 565 9253

Victoria

The Library, CSIRO
314 Albert Street
EAST MELBOURNE VIC 3002
Phone (03) 418 7333

The Library, State Chemistry Laboratory
5 Macarthur Street
MELBOURNE VIC 3000
Phone (03) 651 1150

Victoria (continued)

The Library, Environment Protection Authority
Ministry for Planning and Environment
PO Box 2240T
477 Collins Street
MELBOURNE VIC 3000
Phone (03) 628 5040

Occupational Hygiene Unit
Department of Chemical and Analytical Sciences
Deakin University
Pigdon Road
WAURN PONDS VIC 3217
Phone (052) 27 1111 (Reception)

Queensland

Government Chemical Laboratory
Kessels Road
Coopers Plains
PO Box 594
ARCHERFIELD QLD 4108
Phone (07) 274 9111

South Australia

University of South Australia
Levels Campus Library
PO Box 1
Ingle Farm
SA 5098
Phone (08) 302 3229

Western Australia

Science, Technology and Commerce Branch
Library and Information Service of WA
Alexander Library Building
Perth Cultural Centre
PERTH WA 6000
Phone (09) 427 3218
Service only within WA
and at the discretion of the librarian.

T.L. Robertson Library
Curtin University of Technology
Kent Street
PO Box U198
PERTH 6001
SOUTH BENTLEY WA 6102
Phone (09) 351 7167

Tasmania

State Reference Library
91 Murray Street
HOBART TAS 7000
Phone (002) 33 7457, 33 7526, 33 7458

Northern Territory

Occupational Health and Safety Division
Work Health Authority
PO Box 2010
DARWIN NT 0801
Phone (089) 89 5511

APPENDIX 5

CRITERIA AND FORM FOR NOTIFICATION OF USE OF A GENERIC NAME

Criteria

A5.1 Information to be provided by the manufacturer or importer of a hazardous substance where a Type II ingredient is commercially confidential and a generic name is used to protect the confidentiality of the ingredient.

Notes:

A5.2 The manufacturer or importer responsible for placing the hazardous substance on the market shall provide evidence that the divulging of the chemical identity of the preparation on the label or MSDS will place at risk the confidential nature of his/her property.

A5.3 Specific factors which need to be considered in determining if a claim for commercial confidentiality should be made include:

(a) whether there would be significant detriment to the owner's business if the identity of the substance was disclosed:

(i) if so, an explanation should be provided;

(b) whether the substance is identified by other than trade or generic names in journals or other public sources, for example, registers, public files of government agencies, patent applications, etc;

(c) whether the substance has been granted confidential status in another country:

(i) if so, information on which countries should be provided;

(d) whether the substance has been identified publicly in another country:

(i) if so, information should be provided on why granting confidential status in Australia will protect commercial interest;

(e) whether the substance has been patented:

(i) if so, information should be provided on why granting confidential status will protect commercial interest;

(f) whether a public or private disclosure about the substance has been made outside the owner's organisation regarding the importation or manufacture of the substance;

(g) whether the owner has taken precautions to prevent disclosure that the substance has been manufactured or imported:

(i) if so, information should be provided on what measures have been taken;

(h) what would be the ramifications arising from loss of commercial confidentiality;

(i) whether it would be practicable for competitors to analyse and duplicate the substance;

(j) whether failure to disclose the information would compromise the protection of occupational health, public health or the environment; and

(k) the benefits of having public access to this information.

A5.4 The generic name used on the label and MSDS must be the same.

A5.5 The generic name used should contain enough information about the hazardous substance to ensure risk free handling.

A5.6 In order to avoid multiple notifications, only one declaration of confidentiality is necessary if a set of hazardous substances:

(a) contain the same hazardous ingredients in the same concentration range;

(b) have the same classification and labelling; and/or

(c) have the same intended uses.

A5.7 The declaration of confidentiality must include all the elements provided for in this form, not forgetting the product name of each substance. A single consistent generic name must be used to protect the chemical identity of the same ingredient under consideration in the case of all the substances referred to.

DECLARATION OF CONFIDENTIALITY

1. Name and full address (including telephone number) of the person who is responsible for placing the substance on the market (manufacturer or importer).

2. Precise identification of:

(a) the Type II ingredient(s) for which confidentiality is proposed and the generic name.

(b) Composition of the hazardous substance (as provided in the National Occupational Health and Safety Commission's *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)]).

CAS NO (or AICS* NO)	Chemical Name according to international nomenclature and classification#	Generic Name	Composition %

NB: Where ingredients are classified provisionally, accompanying information (bibliographic references) should be provided as evidence that the provisional classification takes account of all existing pertinent information available on the properties of the ingredient.

* Australian Inventory of Chemical Substances.

\# See the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)].

3. Justification for the confidentiality

4. Product name of the hazardous substance

5. Is the product name the same for use overseas and in all of Australia?

Yes ❑
No ❑

If no, specify the product name used overseas and in the different jurisdictions.

Overseas (country):

Victoria:

New South Wales:

Queensland:

Western Australia:

South Australia:

Tasmania:

Northern Territory:

Australian Capital Territory:

Commonwealth:

6. Classification of the hazardous substance(s) according to the National Occupational Health and Safety Commission's *Approved Criteria for Classifying Hazardous Substances* [NOHSC:1008(1994)].

7. Labelling of the substance(s) according to the National Occupational Health and Safety Commission's *National Code of Practice for the Labelling of Workplace Substances* [NOHSC:2010(1994)].

8. Intended uses for the hazardous substance(s).

9. Material Safety Data Sheet(s) conforming to the National Occupational Health and Safety Commision's *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2011(1994)].

Signature Date

APPENDIX 6

GUIDE FOR SELECTING GENERIC NAMES

A6.1 INTRODUCTORY NOTE

(a) This guide is based on the procedure for naming hazardous substances (division of substances into families) which is described at section A6.3 and EEC Council Directive 67/548/EEC[20].

(b) The families are defined in the following manner:

(i) inorganic or organic substances whose properties are identified by having a common chemical element as their chief characteristic. The family name is derived from the name of the chemical element. These families are identified as in section A6.3 by the atomic number of the chemical element (001 to 013); and

(ii) organic substances whose properties are identified by having a common functional group as their chief characteristic.

- the family name is derived from the functional group name, and
- these families are identified by the number convention found in section A6.2 (601 to 650).

(c) Sub-families bringing together substances with a common specific character have been added in certain cases.

A6.2 ESTABLISHING THE GENERIC NAME

(a) General principles:

In selecting a generic name, the following approach is adopted:

(i) identity of the functional groups and chemical elements present in the molecule; and

(ii) determine the most important functional groups and chemical elements which contribute to its properties.

The identified functional groups and elements taken into account are the names of the families and sub-families set out in section A6.3 in the form of a (non-restrictive) list.

(b) Practical application:

After having conducted a search to see if the substance belongs to one or more families or sub-families on the list, the generic name can be established in the following way:

(i) If the name of a family or sub-family is sufficient to characterise the chemical elements or important functional groups, this name will be chosen as the generic name.

Examples:

— 1,4-dihydroxybenzene
family 604 : phenols and derivatives
- generic name: phenol derivative.

— butanols
family 603 : alcohols and derivatives
sub family : aliphatic alcohols
- generic name : aliphatic alcohol

— 2-Isopropoxyethanol
family 603 : alcohols and derivatives
sub-family: glycolethers
- generic name : glycolether

— methacrylate
family 607 : organic acids and derivatives
sub-family : acrylates
- generic name : acrylate

(ii) If the name of a family or sub-family is not sufficient to characterise the chemical elements of important functional groups, the generic name should be a combination of the corresponding different family or sub-family names:

Examples:

— lead hexafluorosilicate
family 009 : fluorine compounds
sub-family : inorganic fluorides
family 082 : lead compounds
- generic name : inorganic lead fluoride

— chlorobenzene
family 602 : halogenated hydrocarbons
sub-family : halogenated aromatic hydrocarbons
family 017 : chlorine compounds
- generic name : chlorinated aromatic hydrocarbon

— 2,3,6-tricholorophenylacetic acid
family 607 : organic acids
sub-family : halogenated aromatic acids
family 017 : chlorine compounds
- generic name : chlorinated aromatic acid

— 1-chloro-1-nitropropane
family 610 : chloronitrated derivatives
family 601 : hydrocarbons
sub-family : aliphatic hydrocarbons
- generic name : chlorinated aliphatic hydrocarbon

— tetrapropyl dithiopyrophosphate
family 015 : phosphorus compounds
sub-family : phosphoric esters
family 016 : sulphur compounds
- generic name : thiophosphoric ester

NB: In the case of certain elements notably metals, the name of the family or sub-family may be indicated by the words 'organic' or 'inorganic'.

Examples:

— dimercury chloride
family 080 : mercury compounds
- generic name : inorganic mercury compound

— barium acetate
family 056 : barium compounds
- generic name : organic barium compound

— ethyl nitrite
family 007 : nitrogen compounds
sub-family : nitrites
- generic name : organic nitrite

— sodium hydrosulphite
family 016 : sulphur compounds
- generic name : inorganic sulphur compound

A6.3 DIVISION OF SUBSTANCES INTO FAMILIES AND SUB-FAMILIES

Family No	Families Sub-Families
001	Hydrogen compounds
	Hydrides
002	Helium compounds
003	Lithium compounds
004	Beryllium compounds
005	Boron compounds
	Boranes
	Borates
006	Carbon compounds
	Carbamates
	Inorganic carbon compounds
	Salts of hydrogen cyanide
	Urea and derivatives
007	Nirtrogen compounds
	Quaternary ammonium compounds
	Acid nitrogen compounds
	Nitrates
	Nitrites
008	Oxygen compounds
009	Fluorine compounds
	Inorganic fluorides
010	Neon compounds
011	Sodium compounds
012	Magnesium compounds
	Organometallic magnesium derivatives
013	Aluminium compounds
	Organometallic aluminium derivatives
014	Silicon compounds
	Silicanes
	Silicates
015	Phosphorus compounds
	Acid phosphorus compounds
	Phosphonium compounds
	Phosphoric esters
	Phosphates
	Phosphites
	Phosphoramides and derivates
016	Sulphur compounds
	Acid sulphur compounds
	Mercaptans
	Sulphates
	Sulphites

Family No	Families Sub-Families
017	Chlorine compounds
	Chlorates
	Perchlorates
018	Argon compounds
019	Potassium compounds
020	Calcium compounds
021	Scandium compounds
022	Titanium compounds
023	Vanadium compounds
024	Chromium compounds
	Chromium VI compounds
025	Manganese compounds
026	Iron compounds
027	Cobalt compounds
028	Nickel compounds
029	Copper compounds
030	Zinc compounds
	Organometallic zinc derivatives
031	Gallium compounds
032	Germanium compounds
033	Arsenic compounds
034	Selenium compounds
035	Bromine compounds
036	Krypton compounds
037	Rubidium compounds
038	Strontium compounds
039	Yttrium compounds
040	Zirconium compounds
041	Niobium compounds
042	Molybdenum compounds
043	Technetium compounds
044	Ruthenium compounds
045	Rhodium compounds
046	Palladium compounds

Family No	Families Sub-Families
047	Silver compounds
048	Cadmium compounds
049	Indium compounds
050	Tin compounds
	Organometallic tin derivates
051	Antimony compounds
052	Tellurium compounds
053	Iodine compounds
054	Xenon compounds
055	Caesium compounds
056	Barium compounds
057	Lanthanum
058	Cerium compounds
059	Praseodymium compounds
060	Neodymium compounds
061	Promethium compounds
062	Samarium compounds
063	Europium compounds
064	Gandolinium compounds
065	Terbium compounds
066	Dysprosium compounds
067	Holmium compounds
068	Erbium compounds
069	Thulium compounds
070	Ytterbium compounds
071	Lutetium compounds
072	Hafnium compounds
073	Tantanium compounds
074	Tungsten compounds
075	Rhenium compounds
076	Osmium compounds
077	Iridium compounds

Family No	Families Sub-Families
078	Platinum compounds
079	Gold compounds
080	Mercury compounds Organometallic mercury derivatives
081	Thallium compounds
082	Lead compounds Organometallic lead derivatives
083	Bismuth compounds
084	Polonium compounds
085	Astate compounds
086	Radon compounds
087	Francium compounds
088	Radium compounds
089	Actinium compounds
090	Thorium compounds
091	Protactinium compounds
092	Uranium compounds
093	Neptunium compounds
094	Plutonium compounds
095	Americum compounds
096	Curium compounds
097	Berkelium compounds
098	Californium compounds
099	Einsteinium compounds
100	Fermium compounds
101	Mendelevium compounds
102	Nobelium compounds
103	Lawrencium compounds
601	Hydrocarbons Aliphatic hydrocarbons Aromatic hydrocarbons Alicyclic hydrocarbons Polycyclic aromatic hydrocarbons (PAH)

Family No	Families Sub-Families
602	Halogenated hydrocarbons* Halogenated aliphatic hydrocarbons* Halogenated aromatic hydrocarbons* Halogenated alicyclic hydrocarbons* * Specify according to the family corresponding to halogen.
603	Alcohols and derivates Aliphatic alcohols Aromatic alcohols Alicyclic alcohols Alcanolamines Epoxy derivatives Ethers Glycolethers Glycols and polyols
604	Phenols and derivatives Halogenated phenol derivatives* * Specify according to the family corresponding to halogen.
605	Aldehydes and derivates Aliphatic aldehydes Aromatic aldehydes Alicyclic aldehydes Aliphatic acetals Aromatic acetals Alicyclic acetals
606	Ketones and derivatives Aliphatic Ketones Aromatic Ketones* Alicyclic Ketones * Quinones included
607	Organic acids and derivatives Aliphatic acids Halogenated aliphatic acids* Aromatic acids Halogenated aromatic acids* Alicyclic acids Halogenated alicyclic acids* Aliphatic acid anhydrides Halogenated aliphatic acid anhydrides* Aromatic acid anhydrides Halogenated aromatic acid anhydrides* Alicyclic acid anhydrides Halogenated alicyclic acid anhydrides* Salts of aliphatic acid Salts of halogenated aliphatic acid* Salts of aromatic acid Salts of halogenated aromatic acid* Salts of alicyclic acid Salts of halogenated alicyclic acid* Esters of aliphatic acid

Family No	Families Sub-Families
607 cont'd	Esters of halogenated alicyclic acid*
	Esters of aromatic acid
	Esters of halogenated aromatic acid*
	Esters of alicyclic acid
	Esters of halogenated alicyclic acid*
	Esters of glycol ether
	Acrylates
	Methacrylates
	Lactones
	Acyl halogenides
	* Specify according to the family corresponding to halogen.
608	Nitriles and derivatives
609	Nitrated derivatives
610	Chloronitrated derivatives
611	Azoxy and azoic derivatives
612	Aminated derivatives
	Aliphatic amines and derivatives
	Alicyclic amines and derivatives
	Aromatic amines and derivatives
	Aniline and derivatives
	Benzidine and derivatives
613	Heterocyclic basis and derivatives
	Benzimidazote and derivatives
	Imidazol and derivatives
	Pyrethrinoids
	Quinoline and derivatives
	Triazine and derivatives
	Triazole and derivatives
614	Glucosides and alcaloids
	Alcaloid and derivatives
	Glucosids and derivatives
615	Cyantes and isocyanates
	Cyanates
	Isocyanates
616	Amides and derivatives
	Acetamide and derivatives
	Anilides
617	Organic Peroxides
650	Various substances
	Do not use this family. Instead, use the families or sub-families mentioned above.

APPENDIX 7

SAMPLE CONFIDENTIALITY AGREEMENT FOR DISCLOSURE OF COMMERCIALLY CONFIDENTIAL INFORMATION

IN CONSIDERATION of my being given access to confidential information concerning [... insert description of confidential information to be released ...], for the purposes of [... insert the purpose of the release of the confidential information ...].

I ..... hereby undertake as follows:

1. That, except insofar as is necessary to achieve the above purpose, I will not divulge or communicate any of the confidential information to any other person.

2. That I will not use the confidential information for any other purpose than the purpose for which the confidential information was released.

3. That I will provide a secure storage environment for the confidential information and will institute and maintain an effective control of access to the confidential information until such time as it is destroyed after the specific purpose for which the information was released has been completed.

GIVEN by me .....(signature of recipient)

.....(print name and position)

in the presence of .....(signature of witness)

.....(print name and position)

at .....(place of signature) on .....(date of signature)

APPENDIX 8

MATERIAL SAFETY DATA SHEET CHECKLIST

This checklist will assist in ensuring that Material Safety Data Sheets (MSDS) are prepared in accordance with the National Occupational Health and Safety Commission's *National Code of Practice for the Preparation of Material Safety Data Sheets* [NOHSC:2007(1994)] published by the Australian Government Publishing Service, Canberra, 1993. The code of practice should be consulted for further information on the following items.

Conditional information is footnoted with a # All other information is essential.

Introductory Details

- ❑ Page *x* of Total *y*
- ❑ Date of Issue
- ❑ Statement of Hazardous Nature

Company Details

- ❑ Company Name
- ❑ Address
- ❑ Telephone Number
- ❑ Emergency Telephone Number
- ❑ #Telex and Fax Numbers

Identification

- ❑ Product Name
- ❑ Other Names
- ❑ Manufacturer's Product Code
- ❑ UN Number
- ❑ Dangerous Goods Class/Subsidiary Risk
- ❑ Hazchem Code
- ❑ Poisons Schedule Number
- # Packaging Group
- # Pack Size and Container Type

Conditional entry. Information relating to this entry should be included where relevant and available.

Use

- ❑ Major Recommended Uses
- ❑ Major Recommended Method(s) of Application

Physical Description/Properties

- ❑ Appearance
- ❑ Boiling Point/Melting Point
- ❑ Vapour Pressure
- ❑ Specific Gravity
- ❑ Flashpoint
- ❑ Flammability Limits
- ❑ Solubility in Water

Other Properties Ø

- ❑ # Stock Sensitivity
- ❑ # Corrosiveness
- ❑ # Oxidising Properties
- ❑ # Reactivity with Common Substances
- ❑ # Autoignition Temperature
- ❑ # Evaporative Rate
- ❑ # Vapour Density
- ❑ # Odour Threshold
- ❑ # pH
- ❑ # Solubility in Organic Solvents
- ❑ # Per cent Volatiles
- ❑ # Volatile Organic Compounds
- ❑ # Bulk Density

Ingredients (check all ingredients)

- ❑ Chemical name*
- ❑ CAS Number
- ❑ Proportion
- ❑ # Synonyms

Ø This is a core information field even though the individual entries footnoted with a # are conditional. All data on the physical properties of the substance not provided elsewhere that is relevant and available must be included in this sub-section.

Conditional entry. Information relating to this entry should be included where relevant and available.

* Conditional status subject to ingredient type.

Health Hazard Information

Health Effects

- ❑ Acute
- ❑ Swallowed
- ❑ Eye
- ❑ Skin
- ❑ Inhaled
- ❑ Chronic

First Aid

- ❑ Swallowed
- ❑ Eye
- ❑ Skin
- ❑ Inhaled
- ❑ First Aid Facilities

Advice to Doctor

- ❑ Advice to Doctor

Precautions for Use

- ❑ Exposure Standards
- ❑ Engineering Controls[Ø]
- ❑ # Process Modification
- ❑ # Segregation of Processes from Personnel
- ❑ # Vessel Containment Controls
- ❑ # Enclosure of Sources of Substances
- ❑ # Mechanical Handling
- ❑ # Capture of Substances at Source and Disposal with Local Exhaust Ventilation
- ❑ # Dilution Ventilation

Ø This is a core information field even though the individual entries footnoted with a # are conditional. All engineering control data that is relevant and available must be included in this sub-section.

Conditional entry. Information relating to this entry should be included where relevant and available.

Personal Protection

- ❑ Respirator Type (AS 1716)
- ❑ Glove Type
- ❑ Eye Protection
- ❑ Clothing
- ❑ # Other

Flammability

- ❑ Fire Hazards
- ❑ # Ventilation
- ❑ # Earthing
- ❑ Sources of Ignition Advice
- ❑ # Special Equipment
- ❑ # Flameproofing
- ❑ # Flameproof Fittings

Safe Handling Information

Storage and Transport Ø

- ❑ # Location
- ❑ # Fire Separation Distances
- ❑ # Type of Flooring
- ❑ # Bunding
- ❑ # Security
- ❑ # Ventilation
- ❑ # Temperature Conditions
- ❑ # Protection from Weather, Sunlight
- ❑ # Storage Incompatibilities
- ❑ # Type of Container/Package
- ❑ # Dangerous Goods Class/Subsidiary Risk
- ❑ # State/Territory Transport Requirements
- ❑ # Special Transport Requirements

Ø This is a core information field even though the individual entries footnoted with a # are conditional. All safe storage and transport data that is relevant and available must be included in this sub-section.

Conditional entry. Information relating to this entry should be included where relevant and available.

Spills and Disposal

❑ # Minimising Spills/Leaks

❑ Clean Up Spills/Leaks

❑ Precautions for Clean Up Crew

❑ # Special Equipment for Clean Up

❑ # Disposal Containers

❑ Disposal Method

❑ # State/Territory Authority

❑ # Incineration/Landfill Conditions

Fire/Explosion Hazard

❑ Hazards of Use/Storage

❑ List of Dangerous Decomposition or Combustion Products

❑ Fire-fighting Recommendations

❑ Types of Extinguisher/Fire-fighting Agents

❑ Precautions

❑ Protective Clothing

❑ Reactivity

❑ Hazchem Code

Other Information[Ø]

❑ # Toxicity and Ecotoxicity

❑ # Biodegradability

❑ # Persistence in Soil/Water

Contact Point

❑ Title

❑ Telephone Number

Ø This is a core information field even though the individual entries footnoted with a # are conditional. All data relating to the substance not provided elsewhere that is relevant and available must be included in this sub-section.

Conditional entry. Information relating to this entry should be included where relevant and available.

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