Methanamine, N-methyl-: Human health tier II assessment

13 February 2015

CAS Number: 124-40-3

Preface

This assessment was carried out by staff of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) using the Inventory Multi-tiered Assessment and Prioritisation (IMAP) framework.

The IMAP framework addresses the human health and environmental impacts of previously unassessed industrial chemicals listed on the Australian Inventory of Chemical Substances (the Inventory).

The framework was developed with significant input from stakeholders and provides a more rapid, flexible and transparent approach for the assessment of chemicals listed on the Inventory.

Stage One of the implementation of this framework, which lasted four years from 1 July 2012, examined 3000 chemicals meeting characteristics identified by stakeholders as needing priority assessment. This included chemicals for which NICNAS already held exposure information, chemicals identified as a concern or for which regulatory action had been taken overseas, and chemicals detected in international studies analysing chemicals present in babies' umbilical cord blood.

Stage Two of IMAP began in July 2016. We are continuing to assess chemicals on the Inventory, including chemicals identified as a concern for which action has been taken overseas and chemicals that can be rapidly identified and assessed by using Stage One information. We are also continuing to publish information for chemicals on the Inventory that pose a low risk to human health or the environment or both. This work provides efficiencies and enables us to identify higher risk chemicals requiring assessment.

The IMAP framework is a science and risk-based model designed to align the assessment effort with the human health and environmental impacts of chemicals. It has three tiers of assessment, with the assessment effort increasing with each tier. The Tier I assessment is a high throughput approach using tabulated electronic data. The Tier II assessment is an evaluation of risk on a substance-by-substance or chemical category-by-category basis. Tier III assessments are conducted to address specific concerns that could not be resolved during the Tier II assessment.

These assessments are carried out by staff employed by the Australian Government Department of Health and the Australian Government Department of the Environment and Energy. The human health and environment risk assessments are conducted and published separately, using information available at the time, and may be undertaken at different tiers.

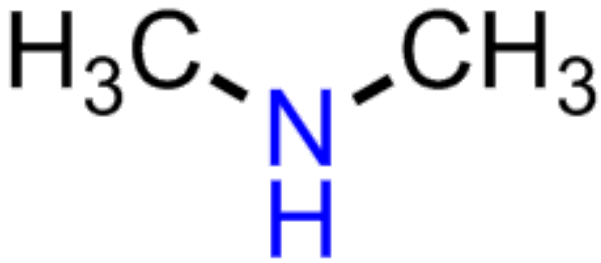
This chemical or group of chemicals are being assessed at Tier II because the Tier I assessment indicated that it needed further investigation.

For more detail on this program please visit:www.nicnas.gov.au

Disclaimer

Acronyms & Abbreviations

Chemical Identity

Synonyms	dimethylamine N-methylmethanamine DMA
Structural Formula	
Molecular Formula	C2H7N
Molecular Weight (g/mol)	45.08
Appearance and Odour (where available)	Colourless gas with amine-like odour (as gas); Clear, colourless liquid with an amine-like odour (as aqueous solution)
SMILES	CNC

Import, Manufacture and Use

Australian

The following Australian industrial uses were reported under previous mandatory and/or voluntary calls for information.

The chemical has reported commercial use with identified uses as:

- a colouring agent;
- softener;
- pH-regulating agent; and
- corrosion inhibitor.

The chemical is listed on the 2006 High Volume Industrial Chemicals List (HVICL) with a total reported volume in the range 1000–9999 tonnes.

International

The following international uses have been identified through the European Union (EU) Registration, Evaluation and Authorisation of Chemicals (REACH) dossiers; Galleria Chemica; the Organisation for Economic Cooperation and Development Screening information data set International Assessment Report (OECD SIAR); the Substances and Preparations in the Nordic countries (SPIN) database; the United States (US) National Library of Medicine (NLM) Household Products Database, and the European Commission Cosmetic Ingredients and Substances (CosIng) database.

The chemical has reported site-limited use including:

- as an accelerator in vulcanising rubber;
- in the manufacture of other chemicals; and

- as a solvent in industrial gas manufacturing and other chemical products and preparations.

The chemical has reported commercial use including in tanning and textile processing.

The chemical is reported to be used in commercial or consumer soaps and detergents. Whilst the chemical has been reported as being present in a limited number of consumer products in the United States (US) up to a concentration of 8.5 %, these products (non-agricultural herbicides) do not fall under the scope of the *Industrial Chemicals (Notification and Assessment) Act 1989* (the Act).

The chemical has reported non-industrial use in:

- food/feedstuff flavourings and nutrients; and
- agricultural pesticides.

Restrictions

Australian

The chemical is not specifically listed in the Poisons Standard—the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP). However, the following general group entry in Schedule 5 of the SUSMP may apply for specific uses (which have not been definitively identified):

'AMINES for use as curing agents for epoxy resins except when separately specified in these schedules' (SUSMP 2014).

Schedule 5 chemicals are described as 'Substances with a low potential for causing harm, the extent of which can be reduced through the use of appropriate packaging with simple warnings and safety directions on the label.' Schedule 5 chemicals are labelled with 'Caution' (SUSMP 2014).

International

The chemical is listed on the following (Galleria Chemica):

- EU Cosmetics Regulation 1223/2009 Annex II—List of substances prohibited in cosmetic products;
- New Zealand Cosmetic Products Group Standard—Schedule 4: Components cosmetic products must not contain;
- Association of South East Asian Nations (ASEAN) Cosmetic Directive Annex II Part 1: List of substances which must not form part of the composition of cosmetic products; and
- Health Canada List of prohibited and restricted cosmetic ingredients (The Cosmetic Ingredient 'Hotlist').

Existing Work Health and Safety Controls

Hazard Classification

The chemical is classified as hazardous, with the following risk phrases for human health in the Hazardous Substances Information System (HSIS) (Safe Work Australia):

Aqueous solution:

- Xn; R20/22 (acute toxicity)
- C; R34 (corrosivity)

Gas:

- Xn; R20 (acute toxicity)
- Xi; R37/38/41 (irritation)

The aqueous solution entry is subject to Note B.

'Note B: Some substances (acids, bases etc.) are placed on the market in aqueous solutions at various concentrations and therefore require different labelling since the hazards vary. For aqueous solutions, the label shown (under 'Labelling') is for the highest concentration range given under the concentration limits, which are shown (under 'Cut-offs'). For the lower concentration ranges, Safety Phrases should be selected according to the normal rules for preparations.

Under ‘Name’ or ‘Synonyms’ a general designation of the following type is used: ‘...% nitric acid’.

In this case the manufacturer or any other person who markets such a substance should give on the label the percentage concentration of the solution.

Example: 45% nitric acid

Unless otherwise stated, it is assumed that the percentage concentration is calculated on a weight/weight basis. The use of other data (for example, specific gravity) or descriptive phrases (for example, fuming or glacial) is permissible.' (Safe Work Australia)

Exposure Standards

Australian

The chemical has an exposure standard of 3.8 mg/m^3 (2 ppm) time weighted average (TWA) and 11 mg/m^3 (6 ppm) short-term exposure limit (STEL).

International

The following exposure standards are identified (Galleria Chemica).

An exposure limit of 1.8–18 mg/m^3 (1–10 ppm) TWA and 9.4–50 mg/m^3 (5–27.6 ppm) STEL in different countries such as Canada, Europe, Indonesia, Singapore, South Africa, United Kingdom and the USA.

The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a threshold limit value (TLV) of 5 ppm 9.2 mg/m^3 TWA and 15 ppm (27.6 mg/m^3) STEL. These values are 'intended to minimize the potential for dermal, ocular, respiratory and gastrointestinal tract irritation.' (ACGIH 2011).

Health Hazard Information

This chemical is a volatile low molecular weight secondary amine substituted with methyl groups. The observed corrosive properties, related to the alkaline properties of the chemical, is the dominant effect for the human health toxicological endpoints. The chemical can be used either as a gas or in solution, and the toxicity profile of the chemical is dependent on the physical form for which it is being used. Where data are not available for the chemical, data have been included for dimethylamine hydrochloride (DMA-HCl, CAS No. 506-59-2) which is equivalent to the chemical following systemic absorption (systemic effects); and from other low molecular weight secondary amines which have similar toxicokinetics (local effects).

Toxicokinetics

The chemical is expected to be readily absorbed by all routes of exposure and has been shown to disrupt the skin permeability barrier in humans (OECD 2013). Lower molecular weight secondary amines are largely excreted in the urine unchanged (Benya, TJ & Harbison, RD 1994).

In a radiolabelling study in rats and mice with the hydrochloride salt of the chemical (DMA-HCl, CAS No. 506-59-2), the chemical was reported to be rapidly absorbed and widely distributed through the blood. The majority of the chemical was excreted unchanged in the urine with only small amounts being demethylated to methylamine (OECD 2013).

Dimethylamine is the major short-chain aliphatic amine present in the urine of humans and rats. Dimethylamine is partly derived from the metabolism of dietary choline and lecithin; which can be formed by enzymatic catalysis from gut bacteria. However, dimethylamine was also shown to be present in significant quantities in gastric fluid, with other endogenous mechanisms for dimethylamine formation possible (Zeisel, SH, DaCosta, KA & Fox, JG 1985).

The urinary excretion of dimethylamine was measured in 203 human volunteers who maintained their normal diets. The daily output for the majority of the subjects was ranged from 0.68 to 35.72 mg (Zhang, AQ, Mitchell, SC & Smith, RL 1995).

Acute Toxicity

Oral

The chemical (in aqueous solution) is classified as hazardous with the risk phrase ‘Harmful if swallowed’ (Xn; R22) in the HSIS (Safe Work Australia). The available data support this classification.

In a study conducted similarly to OECD Test Guideline (TG) 401, the chemical (40 % solution) had moderate acute toxicity in rats, with a median lethal dose (LD50) of about 1000 mg/kg bw reported. Reported signs of toxicity include staggering, atony, spastic gait, dehydration, tremor, salivation, muscle spasms, and poor general state (OECD 2013; REACH).

The chemical has been reported to have moderate to high toxicity in several species, with LD50 values in rats, mice, rabbits and guinea pigs of 698, 316, 240 and 240 mg/kg bw, respectively (ACGIH 2011).

Dermal

The chemical (in aqueous solution) has low acute toxicity, based on results from animal tests following dermal exposure.

In a study conducted similarly to OECD TG 404, the chemical (40 % solution) had low acute toxicity in rats, with the LD50 of 3900 mg/kg bw. Observed sub-lethal effects included apathy, convulsions and lacrimation. Dermal irritation was observed at a dose of 400 mg/kg, while necrosis was observed in the 2500 and 5000 mg/kg dose groups. Necrosis remained unchanged after the 14-day observation period (OECD 2013; REACH).

Inhalation

The chemical (as a gas and in aqueous solution) is classified as hazardous with the risk phrase ‘Harmful by inhalation’ (Xn; R20) in the HSIS (Safe Work Australia). The available data for the gaseous form of the chemical support this classification.

In a GLP non-guideline study conducted similarly to OECD TG 403 (whole-body exposure), the chemical (as a gas) had moderate acute toxicity in rats, with the median lethal concentration (LC50) of 9.9 mg/L-1 h (5290 ppm-1 h) reported. This is calculated to be approximately 4.5 mg/L (2645 ppm) for a four hour exposure. Reported signs of toxicity include laboured breathing, gasping and rales. At necropsy, eye abnormalities (usually corneal opacities) and lung congestion (red discoloration) were the significant macroscopic findings (OECD 2013; REACH). A 4 hour LC50 of 4700 ppm in rats has also been reported (ACGIH 2011).

Corrosion / Irritation

Corrosivity

The chemical (in aqueous solutions) is classified as hazardous with the risk phrase ‘Causes burns’ (C; R34) in the HSIS (Safe Work Australia). The available data support this classification.

Four Vienna white rabbits were exposed to the undiluted chemical under occlusive conditions for three minutes and another two animals were treated for one hour. On intact rabbit skin, the chemical produced severe erythema and oedema after 1 hour. After 8 days, the exposed areas had effects that were not reversible. Whilst the severity of effects were reduced for the three minute exposure, these effects were also not reversible (OECD 2013; REACH).

A 6 % solution of the chemical was reported to cause thickening and ulceration of the skin in rabbits following a single treatment. Similar effects were noted with a 3 % solution after five treatments (ACGIH 2011).

The chemical (40 % solution) was reported to be corrosive to the eyes of rabbits, when tested similarly to OECD TG 405. The average scores for cornea, iris, and conjunctivae were given as 4, 2 and 4 respectively. The effects were not reversible within 72 hours after application (OECD 2013; REACH). Effects such as haemorrhaging in the conjunctivae, corneal oedema and superficial opacities have been reported in rabbits following administration of a 5 % solution (ACGIH, 2011).

There is no evidence of destruction of respiratory tract tissue following single, limited inhalation exposure although respiratory irritant effects have been observed (see **Acute toxicity: inhalation**).

Respiratory Irritation

The chemical (as a gas) is classified as hazardous with the risk phrase 'Irritating to the respiratory system' (Xi; R37) in the HSIS (Safe Work Australia). The available data support the hazard classification.

The chemical was reported to cause upper airway irritation in mice, following 15-min oronasal exposure of the amine, in a study similar to the American Society for Testing and Materials (ASTM) test for estimating sensory irritancy of airborne chemicals (Gagnaire et al. 1989, OECD 2013). The RD50 (exposure concentration producing a 50 % respiratory rate decrease) was 70 ppm (0.13 mg/L). The onset of effects and the recovery following cessation of exposure was reported to be rapid. The study noted that previous studies with several chemicals have shown that RD50 values may be used to estimate acceptable industrial exposure limits (such as TLV). At a RD50 of 0.1, humans would experience some slight discomfort when exposed to the chemicals.

Skin Irritation

The chemical (as a gas) is classified as hazardous with the risk phrase 'Irritating to skin' (Xi; R38) in the HSIS (Safe Work Australia).

There are no data available examining the skin irritation potential of the chemical as a gas, while studies show that the chemical is corrosive in aqueous solutions (see **Corrosivity**). In inhalation exposure carcinogenicity studies in B6C3F1 mice and Fischer 344 (F344) rats, clinical signs included a predominance of irritation associated in and around the eyes (see **Carcinogenicity**), which support the above classification. Dissolution of the gas in skin moisture would be expected to lead to irritant effects.

Eye Irritation

The chemical (as a gas) is classified as hazardous with the risk phrase 'Risk of serious damage to eyes' (Xi; R41) in the HSIS (Safe Work Australia). The data available from various inhalation studies (see **Acute Toxicity** and **Carcinogenicity**) support the classification of the chemical as damaging to the eyes in gaseous form. Dissolution of the gas in eye moisture would be expected to lead to irritant effects.

Sensitisation

Skin Sensitisation

No reliable data are available for the chemical. There is no clear evidence of skin sensitisation potential for other secondary amines such as diethylamine and dibutylamine (OECD 2013).

Repeated Dose Toxicity

Oral

There are no reliable data available.

Dermal

No data are available.

Inhalation

Based on the available information, no hazard classification for repeated dose inhalation toxicity is recommended. However, the available data support the hazard classification for respiratory irritation (refer **Respiratory irritation** section).

In a non-guideline 12-month study, the chemical was administered to B6C3F1 mice and F344 rats by whole-body inhalation at dosages of 0, 10, 50, and 175 ppm (0, 0.018, 0.092, or 0.32 mg/L) per day (6 h/day, 5 days/week). The results for male mice were not included because of the high rate of unscheduled deaths in this group. In the high dose group, the mean body weight gain of rats and mice was approximately 90 % of the control groups after 3 weeks of exposure.

Several changes in clinical chemistry and haematology were seen at the high dose. Degenerative lesions in the respiratory and olfactory epithelia of the nasal cavity were observed which were concentration dependent and considered treatment-related. Areas affected included the respiratory epithelium in the anterior nasal passages, and the olfactory epithelium, especially that lining the anterior dorsal meatus. Other local effects included focal destruction of the anterior nasoturbinate and nasal septum, local inflammation, and focal squamous metaplasia of the respiratory epithelium in rats and mice. There was extensive loss of sensory cells in the olfactory epithelium. In the high dose group, rats had more extensive olfactory lesions than mice. There were minimal changes observed in low dose groups.

The LOAEC of 10 ppm (0.018 mg/L) was determined for local effects based on the effects in the respiratory and nasal epithelia. A NOAEC of 50 ppm (0.092 mg/L) was determined for systemic effects based on reduced body weight gain and changes in clinical chemistry and haematology (OECD 2013; REACH).

Genotoxicity

Based on the weight of evidence from the available in vitro and in vivo genotoxicity studies, the chemical is not considered to be genotoxic.

Negative results were reported in a bacterial reverse mutation test for mutagenicity to *Salmonella typhimurium* (strains included TA98, TA100, TA1535, TA1537 and TA97), with and without metabolic activation. Cytotoxicity was reported at doses greater than 1000 µg/plate (REACH).

Negative results were reported in a non-guideline chromosomal aberration test with Chinese hamster ovary (CHO) cells, with and without metabolic activation (REACH a). In a multiple-endpoint test (mutation at the hypoxanthine-guanine phosphoribosyltransferase—HGPRT locus, sister chromatid exchange (SCE) and chromosome aberration) in CHO cells, the chemical did not exhibit cytotoxic or mutagenic effects although a marginal effect on SCE and chromosome aberrations were seen in the presence of metabolic activation (OECD 2013; REACH). Effects on chromosome aberrations and SCE were not observed in earlier studies and could be due to contamination (US EPA 2008).

The chemical did not induce unscheduled DNA synthesis in primary culture of rat hepatocytes (US EPA 2008; ACGIH 2011).

The chemical did not induce in vivo chromosomal damage in rat bone marrow cells after repeated inhalation exposure (15- and 90-days) at dosages of 0.5 or 1 mg/m^3. The incidence of cells with chromosomal breakage did not exceed controls but the incidence of aneuploid cells after 90 days was nearly double than that reported at 15 days. The study authors attributed this to hypoploid and hyperploid cells. There was no decrease in mitotic activity reported (US EPA 2008; OECD 2013, REACH). No increase in the incidence of chromosomal aberrations was reported in the bone marrow and hepatic cells of mice administered an approximately minimum lethal dose of the chemical (US EPA, 2008).

The chemical did not inhibit mouse testicular DNA synthesis when administered orally to mice at doses of 1000 or 2000 mg/kg, but significant inhibitions were observed when the chemical was administered together with sodium nitrite (US EPA 2008).

Carcinogenicity

Based on the available data, the chemical is not carcinogenic in the absence of nitrosating agents. However, under nitrosamine forming conditions, dimethylamine can form nitrosodimethylamine (CAS No. 62-75-9), which is classified on the HSIS as T; R45 (Carcinogen Cat. 2) (IARC 1987; Safe Work Australia).

In a GLP-compliant non-guideline 24-month study, the chemical was administered to B6C3F1 mice and F344 rats by whole-body inhalation at dosages of 0, 10, 50, and 175 ppm per day (6 h/day, 5 days/week).

Clinical observations varied; however, irritation was observed in and around the eyes in rats and mice. Although there were a large number of microscopic lesions affecting respiratory and olfactory epithelia, including benign and malignant neoplasms, only non-neoplastic lesions in the mucosal lining of the nasal cavity were considered to be due to the chemical, with others typically found in older rats. The severity and incidence of the lesions increased with dose. There was no significant increase in neoplasia of the nasal passage reported in rats or mice (US EPA 2008; OECD 2013; REACH).

The absence of carcinogenic potential in the absence of nitrosating agents was also shown in several oral feeding studies (US EPA 2008; ACGIH 2011). No tumours were observed in rats fed 1600 mg/kg diet/day of the chemical for 2.5 years (actual dose received uncertain). However tumours were found in 12/43 rats simultaneously given 390 mg/kg diet of sodium nitrite (US EPA 2008).

Reproductive and Developmental Toxicity

Limited data are available.

In a prenatal developmental toxicity study conducted in accordance with OECD TG 414, Wistar rats were exposed to the dimethylamine hydrochloride (CAS No. 506-59-2) at dosages of 100, 300 or 1000 mg/kg bw/day by gavage. There were no significant differences between the control and the dose groups for reproductive parameters such as conception rate, mean number of corpora lutea, mean number of implantations, pre- and post-implantation losses, live foetuses and foetal sex ratio. There were incidental foetal external, soft tissue and skeletal malformations in one litter in each of the control, low- and the mid-dose groups. There was no consistent pattern or dose-response relationship. Therefore, the study authors did not consider there to be any chemical-related adverse effects. There was no evidence of an adverse effect of the chemical on foetal morphology at any dose level tested. Based on the results, a NOAEL of 300 mg/kg bw/day was determined for maternal toxicity, based on decreased food consumption and salivation. A NOAEL of 1000 mg/kg bw/day was determined for developmental toxicity.

In 90 day studies in F344 rats and B6C3F1 mice, with the structurally related chemical diethylamine, a dose-related decrease in the motility of sperm was observed at 0.096, 0.19 or 0.37 mg/L (OECD 2013). There are no data to evaluate the impact of this on reproductive toxicity.

Risk Characterisation

Critical Health Effects

The critical health effects for risk characterisation include systemic acute effects (acute toxicity from oral and inhalation exposure) and local effects (corrosivity). The chemical can also cause respiratory irritation, particular following repeated exposure through inhalation.

In the presence of nitrosating agents the chemical can form nitrosodimethylamine which is of concern for carcinogenicity. Whilst the reproductive toxicity of the chemical cannot be fully evaluated, controls in place due to the corrosive properties of the chemical are considered to minimise any potential risk.

Public Risk Characterisation

Whilst the chemical has been reported internationally to be used in commercial or consumer soaps and detergents, widespread domestic use of the chemical has not been identified. In addition, it is expected that the use will be as a neutralising agent, so the corrosive free amine is not expected to be present. Hence, the public risk from this chemical is not considered to be unreasonable. However, if new information becomes available, NICNAS will consider risk management for public use.

Occupational Risk Characterisation

During product formulation, dermal, ocular and inhalation exposure may occur, particularly where manual or open processes are used. These could include transfer and blending activities, quality control analysis, and cleaning and maintaining equipment. Worker exposure to the chemical at lower concentrations could also occur while using formulated products containing the chemical. The level and route of exposure will vary depending on the method of application and work practices employed.

Given the critical systemic acute and local health effects, the chemical could pose an unreasonable risk to workers unless adequate control measures to minimise dermal, ocular and inhalation exposure are implemented. The chemical should be appropriately classified and labelled to ensure that a person conducting a business or undertaking (PCBU) at a workplace (such as an employer) has adequate information to determine the appropriate controls.

Based on the available data, the hazard classification in the HSIS (Safe Work Australia) is considered appropriate.

NICNAS Recommendation

Current risk management measures are considered adequate to protect public and workers' health and safety, provided that all requirements are met under workplace health and safety, and poisons legislation as adopted by the relevant state or territory. No further assessment is required.

Regulatory Control

Public Health

Products containing the chemical should be labelled in accordance with state and territory legislation (SUSMP 2014).

Work Health and Safety

Dimethylamine (aqueous) is recommended for classification and labelling under the current approved criteria and adopted GHS as below. This assessment does not consider classification of physical and environmental hazards.

Dimethylamine (gas) should be classified as Xn; R20, Xi; R37/38/41.

Hazard	Approved Criteria (HSIS)[a]	GHS Classification (HCIS)[b]
Acute Toxicity	Harmful if swallowed (Xn; R22)* Harmful by inhalation (Xn; R20)*	Harmful if swallowed - Cat. 4 (H302) Harmful if inhaled - Cat. 4 (H332)
Irritation / Corrosivity	Causes burns (C; R34)*	Causes severe skin burns and eye damage - Cat. 1B (H314)

[a] Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)].

[b] Globally Harmonized System of Classification and Labelling of Chemicals (GHS) United Nations, 2009. Third Edition.

[*] Existing Hazard Classification. No change recommended to this classification

Advice for consumers

Products containing the chemical should be used according to the instructions on the label.

Advice for industry

Control measures

Control measures to minimise the risk from dermal, ocular and inhalation exposure to the chemical should be implemented in accordance with the hierarchy of controls. Approaches to minimise risk include substitution, isolation and engineering controls. Measures required to eliminate, or minimise risk arising from storing, handling and using a hazardous chemical depend on the physical form and the manner in which the chemical is used. Examples of control measures which could minimise the risk include, but are not limited to:

- using closed systems or isolating operations;
- using local exhaust ventilation to prevent the chemical from entering the breathing zone of any worker;
- air monitoring to ensure control measures in place are working effectively and continue to do so;
- minimising manual processes and work tasks through automating processes;
- work procedures that minimise splashes and spills;
- regularly cleaning equipment and work areas; and
- using protective equipment that is designed, constructed, and operated to ensure that the worker does not come into contact with the chemical.

Guidance on managing risks from hazardous chemicals are provided in the *Managing risks of hazardous chemicals in the workplace—Code of practice* available on the Safe Work Australia website.

Personal protective equipment should not solely be relied upon to control risk and should only be used when all other reasonably practicable control measures do not eliminate or sufficiently minimise risk. Guidance in selecting personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

Obligations under workplace health and safety legislation

Information in this report should be taken into account to help meet obligations under workplace health and safety legislation as adopted by the relevant state or territory. This includes, but is not limited to:

- ensuring that hazardous chemicals are correctly classified and labelled;
- ensuring that (material) safety data sheets ((M)SDS) containing accurate information about the hazards (relating to both health hazards and physicochemical (physical) hazards) of the chemical are prepared; and
- managing risks arising from storing, handling and using a hazardous chemical.

Your work health and safety regulator should be contacted for information on the work health and safety laws in your jurisdiction.

Information on how to prepare an (M)SDS and how to label containers of hazardous chemicals are provided in relevant codes of practice such as the *Preparation of safety data sheets for hazardous chemicals—Code of practice* and *Labelling of workplace hazardous chemicals—Code of practice*, respectively. These codes of practice are available from the Safe Work Australia website.

A review of the physical hazards of the chemical has not been undertaken as part of this assessment.

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