benzaldehyde

Hazard Alert Code: MODERATE

Chemwatch Material Safety Data Sheet Version No: 6.1.1.1 Chemwatch 15772

Issue Date: 16-Nov-2008

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
benzaldehyde

SYNONYMS
C7-H6-O, C6H5-CHO, "benzoic aldehyde", benzenecarbonal, "artificial almond oil", "synthetic oil of bitter almond", "benzene carboxaldehyde", benzenemethylal, phenylmethanal

PROPER SHIPPING NAME
BENZALDEHYDE

PRODUCT USE
Used in the manufacture of perfumes, flavours, dyes cinnamic and benzoic acid, in pharmaceuticals and as a solvent for oils, resins, and cellulose ethers.

SUPPLIER
Company: VWR International, Pty Ltd
Address:
Unit 1/31 Archimedes Place
Murarrie, QLD 4172
Australia
Telephone: 61 7 3009 4100
Emergency Tel: **61 7 3009 4100 (Monday - Friday 8:30am - 5:00pm; General Information)**
Fax: 61 7 3009 4199

Section 2 - HAZARDS IDENTIFICATION

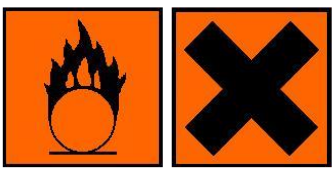
STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. DANGEROUS GOODS. According to the Criteria of NOHSC, and the ADG Code.

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	2		
Reactivity:	2		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



RISK

- Contact with combustible material may cause fire.
- Harmful if swallowed.
- Irritating to eyes and respiratory system.
- Toxic to aquatic organisms.
- HARMFUL - May cause lung damage if swallowed.
- Inhalation may produce health damage*.
- Cumulative effects may result following exposure*.

SAFETY

- Keep away from combustible material.
- Do not breathe gas/ fumes/ vapour/ spray.
- Avoid contact with skin.
- Avoid contact with eyes.
- Wear suitable protective clothing.
- Wear suitable gloves.
- Wear eye/ face protection.

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- May produce skin discomfort*.
- Limited evidence of a carcinogenic effect*.
- Possible skin sensitiser*.
- Vapours potentially cause drowsiness and dizziness*.

* (limited evidence).

- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- To clean the floor and all objects contaminated by this material, use water and detergent.
- Keep container tightly closed.
- Keep away from food, drink and animal feeding stuffs.
- In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
- If swallowed, IMMEDIATELY contact Doctor or Poisons Information Centre (show this container or label).
- This material and its container must be disposed of as hazardous waste.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
benzaldehyde	100-52-7	> 98

Section 4 - FIRST AID MEASURES

SWALLOWED
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Avoid giving milk or oils.
- Avoid giving alcohol.
- If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

EYE

■ If this product comes in contact with the eyes:
- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Seek medical attention without delay; if pain persists or recurs seek medical attention.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin contact occurs:
- Immediately remove all contaminated clothing, including footwear.
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

NOTES TO PHYSICIAN

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced

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mechanically or pharmacologically.
Treat symptomatically.
For simple aldehydes:

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary oedema .

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use water delivered as a fine spray to control fire and cool adjacent area.

FIRE/EXPLOSION HAZARD

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

Combustion products include: carbon dioxide (CO_2), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

HAZCHEM

3Z

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact with the substance, by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.

MAJOR SPILLS

CARE: Absorbent materials wetted with occluded oil must be moistened with water as they may auto-oxidize, become self heating and ignite.
Some oils slowly oxidise when spread in a film and oil on cloths, mops, absorbents may autoxidise and generate heat, smoulder, ignite and burn. In the workplace oily rags should be collected and immersed in water.
Moderate hazard.

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

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Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.

Benzaldehyde has a low auto-ignition temperature (191 C) and can be ignited by,
for example, following exposure to low-pressure steam piping. Rags used to wipe up spills of benzaldehyde, or activated carbon used to absorb vapors of benzaldehyde, have been known to ignite spontaneously (by auto-oxidation).

SUITABLE CONTAINER

- Glass container is suitable for laboratory quantities
- Metal can or drum
- Packaging as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

Benzaldehyde :

- is a strong reducing agent
- reacts violently with oxidisers, including chromium oxide, performic acid, potassium permanganate, aluminium, iron, brass and alloys of these metals, bases, phenol
- may self-ignite if absorbed in combustible material with large surface areas
- forms peroxides with oxides of nitrogen
- Flammable and/or toxic gases are generated by the combination of aldehydes with azo, diazo compounds, dithiocarbamates, nitrides, and strong reducing agents.
- Many aldehydes are incompatible with strong acids, amines, strong oxidisers, and alkaline materials.
- Several medium range aldehydes ignite in air, particularly if exposure is increased by sorption on paper or cloth - ignition often occurs within 2 hours

HAZARD:

- Although anti-oxidants may be present, in the original formulation, these may deplete over time as they come into contact with air.
- Rags wet / soaked with unsaturated hydrocarbons / drying oils may auto-oxidise; generate heat and, in-time, smoulder and ignite. This is especially the case where oil-soaked materials are folded, bunched, compressed, or piled together - this allows the heat to accumulate or even accelerate the reaction
- Oily cleaning rags should be collected regularly and immersed in water, or spread to dry in safe-place away from direct sunlight.or stored, immersed, in solvents in suitably closed containers.
- Avoid strong acids, bases.
- Avoid reaction with oxidising agents, bases and strong reducing agents.

PACKAGING MATERIAL INCOMPATIBILITIES

Chemical Name	Container Type
	"Acetal (Delrinr)", "Buna N (Nitrile)", "Cast iron", CPVC, Epoxy, "Fluorocarbon (FKM)", Hypalonr, "Natural rubber", Neoprene, Polycarbonate, Polypropylene, Polyurethane, PVC, Silicone, Tygonr, Vitonr

STORAGE REQUIREMENTS

- Polymerisation may occur slowly at room temperature.
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Bulk storage of benzaldehyde requires nitrogen blanketing since the substance easily oxidises to benzoic acid upon exposure to air. All storage tank openings should be easily accessible for cleaning since they will have a tendency to plug with benzoic acid.
Samples of benzaldehyde should also be drawn in the presence of nitrogen.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

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EXPOSURE CONTROLS

The following materials had no OELs on our records

• benzaldehyde: CAS:100-52-7

MATERIAL DATA

BENZALDEHYDE:

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations.

CEL TWA: 2 ppm, 8.7 mg/m3; STEL 4 ppm, 17.4 mg/m3 (compare WEEL-TWA, STEL)

(CEL=Chemwatch Exposure Limit)

Odour Threshold Value; variously reported as 0.0060 ppm an 0.042 ppm.

Saturated vapor concentration at 26.2 C: 1300 ppm.<.

PERSONAL PROTECTION

RESPIRATOR

● Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber

NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and

has to be observed when making a final choice.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.

ENGINEERING CONTROLS

■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be

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independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Care: Atmospheres in bulk storages and even apparently empty tanks may be hazardous by oxygen depletion. Atmosphere must be checked before entry.
Requirements of State Authorities concerning conditions for tank entry must be met. Particularly with regard to training of crews for tank entry; work permits; sampling of atmosphere; provision of rescue harness and protective gear as needed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE
Combustible, strongly refractive liquid (1.5440 - 1.5464 @ 20C) with almond odour. Readily oxidised to benzoic acid on keeping and taking on a yellow colour. Miscible with alcohol, and ether but only slightly soluble in water. Turns yellow on storage.

PHYSICAL PROPERTIES

Liquid.
Does not mix with water.
Sinks in water.

State	Liquid	Molecular Weight	106.1
Melting Range (°C)	-26	Viscosity	Not Available
Boiling Range (°C)	179	Solubility in water (g/L)	Immiscible
Flash Point (°C)	62.7	pH (1% solution)	Not applicable
Decomposition Temp (°C)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°C)	191.6	Vapour Pressure (kPa)	4.9 @ 20C
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.04
Lower Explosive Limit (%)	1.4	Relative Vapour Density (air=1)	3.7
Volatile Component (%vol)	100	Evaporation Rate	< 1 BuAc=1

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS
SWALLOWED
■ Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733).
If taken orally, benzaldehyde may be harmful; the human lethal dose is about 60 grams. Animal testing showed that exposure over extended periods may cause tremor, excitement, inactivity, brain damage, pre-cancerous changes to the forestomach, liver and kidney damage and even death.
EYE
■ This material can cause eye irritation and damage in some persons.
High concentrations of benzaldehyde vapour may cause irritation and excessive tear secretion, redness and

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pain. Severe exposures may cause eye injury.

SKIN

■ Benzaldehyde may produce cross-sensitivites with benzoic acid, vanilla, and balsam of Peru.

Open cuts, abraded or irritated skin should not be exposed to this material.

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.

INHALED

■ The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.

Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual.

Benzaldehyde, taken by mouth, may be harmful; about 60 grams causes death in humans. Animal testing showed that poisoning can cause tremor, hyperexcitability, enlargement of the fore-stomach, and damage the brain, liver and kidney.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

There is limited evidence that, skin contact with this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

Animal testing revealed that it was unclear whether benzaldehyde promotes tumour formation.

TOXICITY AND IRRITATION

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

For certain benzyl derivatives:

The members of this group are rapidly absorbed through the gastrointestinal tract, metabolised primarily in the liver, and excreted primarily in the urine either unchanged or as conjugates of benzoic acid derivatives. At high dose levels, gut micro-organisms may act to produce minor amounts of breakdown products. However, no adverse effects have been reported even at repeated high doses. Similarly, no effects were observed on reproduction, foetal development and tumour potential.

SENSITISER

benzaldehyde	IUCLID Photodegradation Data	Sensitiser

SKIN

benzaldehyde	GESAMP/EHS Composite List - GESAMP Hazard Profiles	D1: skin irritation/corrosion	0

Section 12 - ECOLOGICAL INFORMATION

Toxic to aquatic organisms.

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
benzaldehyde	LOW	No Data Available	LOW	HIGH

GESAMP/EHS COMPOSITE LIST - GESAMP Hazard Profiles

Name / Cas No	EHS	TRN	A1a	A1b	A1	A2	B1	B2	C1	C2	C3	D1	D2	D3	E1	E2	E3

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/
RTECS
No

/	293	85	0		0	R	0	0	0	0	0		1			D	1

CAS:100
- 52- 7
/

Legend: EHS=EHS Number (EHS=GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships) NRT=Net Register Tonnage, A1a=Bioaccumulation log Pow, A1b=Bioaccumulation BCF, A1=Bioaccumulation, A2=Biodegradation, B1=Acuteaquatic toxicity LC/ECIC50 (mg/l), B2=Chronic aquatic toxicity NOEC (mg/l), C1=Acute mammalian oral toxicity LD50 (mg/kg), C2=Acutemammalian dermal toxicity LD50 (mg/kg), C3=Acute mammalian inhalation toxicity LC50 (mg/kg), D1=Skin irritation & corrosion, D2=Eye irritation& corrosion, D3=Long-term health effects, E1=Tainting, E2=Physical effects on wildlife & benthic habitats, E3=Interference with coastal amenities, For column A2: R=Readily biodegradable, NR=Not readily biodegradable. For column D3: C=Carcinogen, M=Mutagenic, R=Reprotoxic, S=Sensitising, A=Aspiration hazard, T=Target organ systemic toxicity, L=Lunginjury, N=Neurotoxic, I=Immunotoxic. For column E1: NT=Not tainting (tested), T=Tainting test positive. For column E2: Fp=Persistent floater, F=Floater, S=Sinking substances. The numerical scales start from 0 (no hazard), while higher numbers reflect increasing hazard. (GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships)

Section 13 - DISPOSAL CONSIDERATIONS

- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

Labels Required: MISCELLANEOUS
HAZCHEM:
3Z (ADG7)
Land Transport UNDG:

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Class or division:	9	Subsidiary risk:	None
UN No.:	1990	UN packing group:	III

Shipping Name:BENZALDEHYDE

Air Transport IATA:

ICAO/IATA Class:	9	ICAO/IATA Subrisk:	None
UN/ID Number:	1990	Packing Group:	III
Special provisions:	None		
Cargo Only			
Packing Instructions:	964	Maximum Qty/Pack:	220 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	964	Maximum Qty/Pack:	100 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y964	Maximum Qty/Pack:	30 kg G

Shipping name:BENZALDEHYDE

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	1990	Packing Group:	III
EMS Number:	F-A,S-A	Special provisions:	None
Limited Quantities:	5 L		

Shipping name:BENZALDEHYDE

GESAMP hazard profiles for this material can be found in section 12 of the MSDS.

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE
None

REGULATIONS
benzaldehyde (CAS: 100-52-7) is found on the following regulatory lists;
"Australia - South Australia Controlled Substances (Poisons) Regulations - Schedule C - Certain substances declared as poisons - section 17C precursors", "Australia - Victoria Drugs, Poisons and Controlled Substances (Precursor Chemicals) Regs 2007 - Schedule 1 - Precursor Chemicals and Quantities", "Australia Hazardous Substances", "Australia Illicit Drug Precursors/Reagents - Category II", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Fragrance Association (IFRA) Standards Restricted", "International Fragrance Association (IFRA) Survey: Transparency List", "International Fragrance Association IFRA Standards Annex I", "OECD List of High Production Volume (HPV) Chemicals"

Section 16 - OTHER INFORMATION

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

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Issue Date: 16-Nov-2008
Print Date:16-Aug-2012