

MATERIAL SAFETY DATA SHEET**cyanco****Cyanco® Sodium Cyanide, Bricks 98/99 %**

Material no.		Version	1.6 / US
Specification	166161	Revision date	09/16/2009
Order Number		Print Date	09/16/2009
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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING**Product information**

Trade name : Cyanco® Sodium Cyanide, Bricks 98/99 %
Use of the Substance / : Raw material for industrial use
Preparation
Function : Electroplating agent
Gold mining

Company : Cyanco Corporation
5505 Cyanco Drive
Winnemucca, NV 89445-4807
USA

Telephone : 973-541-8000

Telefax : 973-541-8040

US: CHEMTREC EMERGENCY NUMBER : 800-424-9300

CANADA: CANUTEC EMERGENCY NUMBER : 613-996-6666

Product Regulatory Services : 973-541-8060

2. HAZARDS IDENTIFICATION***** EMERGENCY OVERVIEW *****

Form-solid **Color-white** **Odor-distinct, similar to bitter almond**

Very toxic by inhalation, in contact with skin and if swallowed.
Contact with acids liberates very toxic gas.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Hydrocyanic acid may cause all degrees of poisoning.
Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures.
Avoid contact with acids, air humidity, water.

Causes severe eye burns.

Eye contact

Corrosive. May cause burns resulting in permanent damage.

Skin Contact

Highly toxic. May be fatal if absorbed through the skin.

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Inhalation

Highly toxic. May be fatal if inhaled.

Ingestion

Highly toxic. May be fatal if swallowed.

Potential environmental effect

Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS**Information on ingredients / Hazardous components**

Sodium cyanide			
CAS-No.	143-33-9	Percent (Wt./ Wt.)	99.5 %

4. FIRST AID MEASURES**General advice**

Seek qualified Medical attention immediately!

IMPORTANT: Specific antidote treatment recommendations may vary by region or country. See Material Safety Data Sheet for proper treatment in your region or contact nearest hospital emergency room for recommendations.

When responding to cyanide emergencies, always implement self-protection, measures.

While protecting your self from exposure, remove the affected persons from the hazard area.

Always use protective equipment items (e.g. suitable respiratory equipment and suitable protective clothing / protective gloves made of butyl rubber, fluoro rubber, chloroprene rubber, etc.).

Immediately start decontamination, while removing contaminated or soaked clothing immediately for safe disposal.

After decontamination with large amounts of flowing water is complete, keep warm, position comfortably, and cover as necessary.

Patients who are unconscious but breathing should be placed in the stabilized lateral position.

In case of cardiac arrest, begin protected cardiopulmonary resuscitation (CPR) immediately. (NEVER PERFORM DIRECT MOUTH TO MOUTH BREATHING due to possible exposure to the rescuer!)

If available and recommended in your region, amyl nitrite may be indicated as a first aid measure for the treatment of cyanide.

Always apply oxygen if available.

Never leave the victims unattended.

Inhalation

Inhalation is possible if cyanide is in the form of aerosols, mists, dusts, or smoke.

Never perform direct mouth-to-mouth or mouth-to-nose artificial respiration. Use artificial respiration bag or respirator due to the potential danger of poisoning the rescuers!

There is a danger of poisoning the rescuers!

Maintain an open airway

In case of breathing difficulties immediately apply oxygen.

Immediately contact the emergency doctor immediately (alarm report: cyanide / hydrocyanic acid poisoning).

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Skin contact

No cases of cyanide intoxication have been observed to date following contact with dry sodium or potassium cyanide on dry skin free of injuries. However, if the dry sodium or potassium cyanide comes in contact with moisture or acids, then hydrogen cyanide may be released, causing cyanide intoxication. Wash off immediately using large amounts of water (and soap if available) while removing all contaminated clothes and shoes.

Immediately contact or summon an emergency physician immediately in case of intoxication symptoms (key terms: intoxication with cyanide / prussic acid).

Eye contact

In case of contact with the eyes, immediately flush eyes with copious amounts of water for a minimum of 15 minutes while removing clothes. It is important to seek medical attention for all eye exposures due to potential caustic burns of the eyes.

Immediately contact or summon an emergency physician in case of intoxication symptoms (key terms: intoxication with cyanide / prussic acid).

An ophthalmologist should also be consulted for evaluation of caustic burns to the eyes. Eye burns may not be apparent for up to 48 hours post exposure due to the caustic properties of sodium cyanide.

Ingestion

Thoroughly rinse mouth with water.

Seek professional medical care immediately.

Do not induce vomiting

Call emergency doctor immediately (alarm report: cyanide / hydro-cyanic acid poisoning).

Immediately transport to a medical facility.

Notes to physician

IMPORTANT: Specific antidote and treatment may vary by region. If you are not familiar with current treatment recommendations, you should contact the Poison Control Center for your region or country for specific recommendations and guidelines.

Possible signs of poisoning:

Intoxication is classified by 2 categories:

Mild poisoning

Severe poisoning

The following symptoms are not sufficient to ensure a correct diagnosis:

Symptoms of the central nervous system:

Early stage: headache, dizziness, somnolence (drowsiness), nausea.

Advanced stage: seizures, coma.

Pulmonary symptoms:

Early stage: dyspnea, tachypnea.

Advanced stage: hyperventilation, Cheyne-Stokes respiration, apnea.

Cardiovascular symptoms:

Early stage

hypertension, sinus arrhythmia, atrioventricular arrhythmia, bradycardia.

Advanced stage: tachycardia, complex arrhythmia, cardiac arrest.

Skin symptoms:

Early stage: rosy skin color.

Advanced stage: cyanosis.

Effect on the metabolism:

Lactate acidosis: pH 7.1 and lactate level of 17 mmol/l are described.

Treatment:

NOTE: The treatment advice may vary by region. See Material Safety Data Sheet or contact regional poison control center for appropriate antidote treatment used in your region.

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The rescuer or medical responder should first of all protect themselves from exposure.

Decontaminate the victim to prevent further absorption and exposure to rescuers. Monitor vital signs. Rapid treatment with appropriate antidote therapy is essential to saving lives during a high dose acute exposure to cyanide. NOTE: removal of toxic substance has equal importance to implementation of antidote therapy.

NOTE: This is an outline of antidotes available for informational purposes. It is important for the treating physician to be familiar with the administration of cyanide antidotes available in the country where the chemical is being used!

Mild poisoning

Treatment is dependant on clinical presentation with symptoms and history of exposure (related to dose).

100% oxygen and artificial respiration if indicated.

Closely monitor patient and their vital signs (Blood pressure, pulse and respirations).

Monitor the patient for onset of symptoms or deterioration of status.

Depending on the pathology and clinical findings, based on strictly monitored controls of the clinical findings, it may be necessary for the physician to implement symptom-oriented treatment for pulmonary edema prophylaxis. X-rays of the lungs may be necessary for pulmonary edema diagnosis.

Specific antidote treatment can be indicated for moderate to severe cyanide intoxication: (It is important to know that there are several different types of antidotes available for treatment of cyanide intoxication in different countries) If the treating physician is not familiar with cyanide exposure and treatment, they should contact the medical division of their regional poison control centers for immediate assistance with additional information as needed.

For all cyanide exposure:

All cyanide exposed persons should undergo continued monitoring for several hours, even if patient feels well to ensure there are no residual or recurrent poisoning symptoms.

Severe poisoning

Artificial respiration with 100% oxygen.

Immediate antidote administration with the legal antidote for the country of the exposure.

Listed below are the two most commonly used antidotes:

1. Methemoglobin-forming agent

Nitrite Therapy: (amyl nitrite, sodium nitrite and sodium thiosulfate) (commonly referred to as the Taylor, Lilly or Pasadena Cyanide Antidote Kit).

For moderate to severe exposures (patient still conscious)

Amyl Nitrite Spirols: (1-3 spirols administered as an inhalant, held 1 -2 inches under the nose for 15-30 seconds, and then remove for 15-30 seconds) (read medication information insert prior to administering).

Sodium nitrite 300 - 600 mg administered intravenously over a period of 5 to 15 minutes.

Sodium Thiosulfate (12.5 g - 100-500 mg/kg weight) intravenously over a period of 15-20 minutes.

If patient is conscious, then sodium Thiosulfate may be administered as an antidote by itself: (see antidote package information insert)

Sodium Thiosulfate (12.5 g - 100-500 mg/kg weight) IV may be administered depending on the clinical presentation and symptoms.

2. Complexing antidote agent: Hydroxycobalamin (commonly known as the Cyanokit)

Treatment as follows:

Administer hydroxocobalamin (Cyanokit®) 5 g i.v. (70 mg/kg b.w. in adults) by infusion over a period of 20 - 30 minutes. Administration of this dose can be repeated as required depending on the severity of poisoning. Infusion time for repeated dose: 30 minutes to 2 hours. The only permissible route of administration for hydroxocobalamin is intravenously. (The physician should read the medication package information carefully to ensure proper reconstitution to liquid state and administration of antidote!).

5. FIRE-FIGHTING MEASURES

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Flash point Not combustible.

Autoignition temperature not applicable

Suitable extinguishing media

alkali powder quenching agent

Extinguishing media which must not be used for safety reasons

water foam acidic quenching agents acidic powder quenching agents; carbon dioxide (CO2)

Specific hazards during fire fighting

May be released in case of fire: Hydro-cyanic acid

Special protective equipment for fire-fighters

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

Further information

Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Ensure there are sufficient retaining facilities for water used to extinguish fire. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

As in any fire, wear self-contained positive-pressure breathing apparatus, (MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Wear personal protective equipment.

Keep out unprotected persons.

Keep unauthorized persons away.

Avoid dust formation.

Ensure sufficient ventilation. Avoid skin contact because of the danger of skin absorption.

Environmental precautions

Do not allow entrance in soil, stretches of water, groundwater, drainage systems, surface water.

Cyanide-containing sewage water and solutions must be decontaminated before entering a public canal network or stretch of water.

Methods for cleaning up

1. solid:

Pick up mechanically. Collect in suitable containers.

Reuse or eliminate absorbed material according to the regulations in force.

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2. solution:

Absorb with liquid-binding material, e. g.: inert absorbent, diatomaceous earth or acid neutralizer

Pick up mechanically. Collect in suitable containers.

Reuse or eliminate absorbed material according to the regulations in force.

Waste to be packed like clean product and to be marked. Identification label on packages not to be removed until recycling.

7. HANDLING AND STORAGE**Handling****Safe handling advice**

Store under lock and key or in a way that only skilled persons have access to it.
Ensure ventilation when opening container. Traces of HCN may adhere to product.
Seal container hermetically immediately after use.

Be careful when opening the package, since toxic and caustic gases and vapours may escape.

Advice on protection against fire and explosion

The product is not combustible.
see section 5.

In case of release hydrocyanic acid:

Formation of flammable or explosive dust/air mixtures possible.

Storage**Requirements for storage areas and containers**

clean, dry, lockable.
Keep container tightly sealed and store in a dry, well-ventilated place.
Unsuitable materials aluminium

Advice on common storage

Do not store together with: acid and acidic salts.
Keep away from food, drink and animal feedingstuffs.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Product occupational exposure guidelines****• Sodium cyanide**

CAS-No.	143-33-9	EC-No.	205-599-4
Control parameters	5 mg/m ³ as CN		PEL:(OSHA Z1)
Control parameters	as CN		Skin designation:(OSHA Z1)
Remarks	Can be absorbed through the skin.		
Control parameters	5 mg/m ³ as CN		Ceiling Limit Value:(ACGIH)
Control parameters	as CN		Skin designation:(ACGIH)
	Can be absorbed through the skin.		
Control parameters	5 mg/m ³ as CN		Time Weighted Average (TWA)

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Control parameters as CN
Can be absorbed through the skin.

Permissible Exposure Limit (PEL):(US CA OEL)
Skin designation:(US CA OEL)

Component occupational exposure guidelines**• Hydrogen cyanide**

CAS-No. 74-90-8
Control parameters 4.7 ppm as CN
as CN
Can be absorbed through the skin.

10 ppm
11 mg/m³
Can be absorbed through the skin.

4.7 ppm
5 mg/m³
Can be absorbed through the skin.

Ceiling Limit Value:(ACGIH)
Skin designation:(ACGIH)

PEL:(OSHA Z1)
Skin designation:(OSHA Z1)

Ceiling Limit Value:(US CA OEL)
Skin designation:(US CA OEL)

• Sodium cyanide

CAS-No. 143-33-9
5 mg/m³ as CN
as CN
Can be absorbed through the skin.

5 mg/m³ as CN
as CN
Can be absorbed through the skin.

5 mg/m³ as CN
as CN
Can be absorbed through the skin.

Time Weighted Average (TWA)
Permissible Exposure Limit (PEL):(US CA OEL)
Skin designation:(US CA OEL)

Other information

Suitable measuring processes are:

Sodium cyanide

OSHA method ID 120

NIOSH method 7904

Hydro-cyanic acid

OSHA method ID 120

Engineering measures

Engineer out the risk of exposure.

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Ensure suitable suction/aeration at the work place and with operational machinery.

Personal protective equipment**Respiratory protection**

A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

Hand protection

Glove material	Natural rubber (NR)
Material thickness	0.5 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Nitrile
Material thickness	0.11 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Nitrile
Material thickness	0.33 mm
Break through time	>= 480 min
Method	DIN EN 374
Glove material	Polychloroprene with natural-latex liner.
Material thickness	0.6 mm
Break through time	>= 480 min
Method	DIN EN 374

The above mentioned hand protection is based on knowledge of the chemistry and anticipated uses of this product but it may not be appropriate for all workplaces. A hazard assessment should be conducted prior to use to ensure suitability of gloves for specific work environments and processes prior to use.

Eye protection

wear basket-shaped glasses

Skin and body protection

Wear chemical protective suit.

During cleaning work: rubber or plastic boots.

To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR1910.132) be conducted before using this product.

A safety shower and eye wash fountain must be readily available.

Wash contaminated clothing before re-use.

Hygiene measures

Avoid contact with skin.

After contact with skin, wash immediately with plenty of water.

No eating, drinking, smoking, or snuffing tobacco at work. Wash face and/or hands before break and end of work.

preventive skin protection

Keep working clothes separately.

Avoid contaminating clothes with product.

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Immediately change moistened and saturated work clothes.
Immediately rinse contaminated or saturated clothing with water.

Protective measures

The work-place related airborne concentrations have to be kept below of the indicated exposure limits. If the limits at the workplace are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used.
All precautionary measures indicated have to be observed.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	solid
Color	white
Odor	distinct, similar to bitter almond

Safety data

pH	ca. 11 - 12 (20 g/l) Medium: water (Circa (ca.) - around, aprox.)
Melting point/range	562 °C
Boiling point/range	1497 °C
Flash point	Not combustible.
Flammability	not flammable
Autoignition temperature:	not applicable
Autoinflammability	no
Vapor pressure	100 Pa (800 °C)
Density	ca. 1.6 g/cm ³ (20 °C)
Bulk density	ca. 750 - 950 kg/m ³ (powder) (granulate) (compacts)
Water solubility	ca. 370 g/l (20 °C) ca. 450 g/l (> 35 °C)
Partition coefficient (n-octanol/water)	log Pow: -0.44 Method: (calculated)
Viscosity, dynamic	not applicable
Viscosity, kinematic	not applicable

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10. STABILITY AND REACTIVITY

Conditions to avoid	Hydrogen cyanide forms if heated above 300 °C.
Materials to avoid	Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures., Keep away from acidic salts.
Hazardous decomposition products	HCN: Hydrogen cyanide (hydrocyanic acid)

11. TOXICOLOGICAL INFORMATION

Product Acute oral toxicity	LD50 Rat: 5 mg/kg Method: literature
Product Acute dermal toxicity	LD50 Rabbit(female): 11.8 mg/kg Method: literature
Product Skin irritation	Due to acute dermal toxicity, the irritative effect on the skin cannot be determined.
Product Eye irritation	Rabbit irritating Method: literature Test substance: solid product
Product Repeated dose toxicity	Oral Rat Testing period: 11.5 month NOEL: 75 mg/kg target organ/effect: thyroid., brain Feeding experiments chronic related to substance: Potassium cyanide Oral Rat Testing period: 90 d NOAEL: ca. 0.3 mg/kg target organ/effect: reproductive system drinking water analysis Subchronic toxicity related to substance: Potassium cyanide Oral mouse NOAEL: ca. 16.2 mg/kg target organ/effect: reproductive system drinking water analysis Subchronic toxicity related to substance: Potassium cyanide
Product Gentoxicity in vitro	Ames test Salmonella typhimurium negative

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Method: literature

mammalian cells
negative
Method: literature

Product Human experience

Inhaling of (at already approx. 200 ppm HCN in the air breathed) or swallowing (approx. 200 - 300 mg KCN) can result in immediate unconsciousness and death.

Can be absorbed through the skin.

Following long-term exposition (15 ppm) individual cases of thyroid dysfunction have been described.

related to substance: Hydro-cyanic acid

12. ECOLOGICAL INFORMATION**Elimination information (persistence and degradability)**

Biodegradability potentially biodegradable

Abiotic degradation
hydrolysis**Behaviour in environmental compartments**

Bioaccumulation low

Adsorption am in the ground:
possible

Mobility

logKOC: ((air))
high
related to substance: Hydro-cyanic acid**Ecotoxicity effects**

Toxicity to fish

LC50 *Oncorhynchus mykiss*: 0.042 mg/l / 96 h
Method: literature
related to substance: C N -EC 10 *Salvelinus fontinalis*: 0.011 mg/l / 144 d
Method: literature
reproduction
related to substance: C N -NOEC *Salvelinus fontinalis*: 0.006 mg/l / 144 d
Method: literature
reproduction
related to substance: C N -

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Toxicity to daphnia
EC50 Daphnia magna: 0.041 mg/l / 48 h
Test substance: 2-Hydroxy-2-methylpropionitrile
Method: US-EPA
related to substance: C N -

EC 10 Moinodaphnia spec.: 0.022 mg/l / 5 d
Method: literature
reproduction
related to substance: C N -

Toxicity to algae
IC 10 Scenedesmus acuminatus: 0.03 mg/l / 8 d
Method: literature
chronic
related to substance: C N -

Toxicity to bacteria
EC 10 Pseudomonas putida: 0.001 mg/l / 16 h
Method: literature
related to substance: C N -

EC50 Activated sludge: 0.6 mg/l / 0.5 h
Method: 87/302/EEC
related to substance: C N -

EC 10 Uronema parduczi: 0.27 mg/l / 20 h
Method: literature
related to substance: C N -

Toxicity in organisms which live in the soil
EC50 Lumbriculus variegatus: 11 mg/l / 96 h
Method: literature
related to substance: C N -

Toxicity in terrestrial plants
EC50 terrestrial plants: 22.4 mg/l
Method: literature
related to substance: C N -

Toxicity in other terrestrial non-mammals
birds: moderate
Test substance: Sodium cyanide
related to substance: C N -

EC50 Lymnaea luteola: 2.5 mg/l / 96 d
Method: literature
related to substance: C N -

EC50 Plecoptera: 0.43 mg/l / 96 d
Method: literature
related to substance: C N -

13. DISPOSAL CONSIDERATIONS**WASTE DISPOSAL**

Advice on disposal

Waste must be disposed of in accordance with local, state, provincial and federal laws and regulations. Empty containers must be handled with care

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due to product residue.

14. TRANSPORT INFORMATION**D.O.T. Road/Rail**

Class	6.1
UN-No	1689
Packing group	I
Proper shipping name	SODIUM CYANIDE, SOLID
Marine pollutant	Marine pollutant

Sea transport IMDG-Code

Class	6.1
UN-No	1689
Packaging group	I
Marine pollutant	Marine pollutant
EmS	F-A, S-A
Proper technical name (Proper shipping name)	SODIUM CYANIDE, SOLID
Marine pollutant	Marine pollutant

Air transport ICAO-TI/IATA-DGR

Class	6.1
UN-No	1689
Packaging group	I
Proper technical name (Proper shipping name)	Sodium cyanide, solid

Loading instructions/Remarks

IATA_C	ERG-Code 6L
IATA_P	ERG-Code 6L
IMDG	Keep separate from acids.
IMDG	Do not stow in external container rows

Transport/further information

Do not store together with acids (danger of toxic gases) or with foodstuffs, consumables and feedstuffs.

15. REGULATORY INFORMATION**US Federal Regulations****OSHA**

If listed below, chemical specific standards apply to the product or components:

- None listed

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Clean Air Act Section (112)

If listed below, components present at or above the de minimus level are hazardous air pollutants:

- Sodium cyanide
CAS-No. 143-33-9

CERCLA Reportable Quantities

If listed below, a reportable quantity (RQ) applies to the product based on the percent of the named component:

- Sodium cyanide
CAS-No. 143-33-9
Reportable Quantity 10 lbs

SARA Title III Section 311/312 Hazard Categories

The product meets the criteria only for the listed hazard classes:

- Acute Health Hazard

SARA Title III Section 313 Reportable Substances

If listed below, components are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

- Sodium cyanide
CAS-No. 143-33-9

Toxic Substances Control Act (TSCA)

If listed below, non-proprietary substances are subject to export notification under Section 12 (b) of TSCA:

- None listed

Other US Federal Regulatory Information

Other countries: observe the national regulations.

State Regulations**California Proposition 65**

A warning under the California Drinking Water Act is required only if listed below:

- None listed

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International Chemical Inventory Status

Unless otherwise noted, this product is in compliance with the inventory listing of the countries shown below. For information on listing for countries not shown, contact the Product Regulatory Services Department.

- | | |
|--------------------------|-------------------|
| • Europe (EINECS/ELINCS) | Listed/registered |
| • USA (TSCA) | Listed/registered |
| • Canada (DSL) | Listed/registered |
| • Australia (AICS) | Listed/registered |
| • Japan (MITI) | Listed/registered |
| • Korea (TCCL) | Listed/registered |
| • Philippines (PICCS) | Listed/registered |
| • China | Listed/registered |

16. OTHER INFORMATION**HMIS Ratings**

Health :	3
Flammability :	0
Physical Hazard :	1

Further information

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.