

Spirax Sarco Delta 987

Spirax Sarco Australia

Chemwatch Hazard Alert Code: 3

Chemwatch: 4915-68

Version No: 9.1

Material Safety Data Sheet according to NOHSC and ADG requirements

Issue Date: 10/03/2023

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SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Spirax Sarco Delta 987
Chemical Name	Not Applicable
Synonyms	bactericide/bacteriocide microbiocide fungicide
Proper shipping name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains 2,2-dibromo-3-nitropropionamide)
Chemical formula	Not Applicable
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Microorganism control agent for water purification.
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Details of the manufacturer or supplier of the safety data sheet

Registered company name	Spirax Sarco Australia
Address	14 Forge Street Blacktown NSW 2148 Australia
Telephone	1300 SPIRAX (774 729), +61 2 9852 3100 +61 2 9852 3100
Fax	+61 2 9831 4554
Website	Not Available
Email	sales@au.spiraxsarco.com

Emergency telephone number

Association / Organisation	CHEMWATCH EMERGENCY RESPONSE (24/7)
Emergency telephone numbers	+61 1800 951 288
Other emergency telephone numbers	+61 3 9573 3188

Once connected and if the message is not in your preferred language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

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

COMBUSTIBLE LIQUID, regulated for storage purposes only

Poisons Schedule	Not Applicable	
Risk Phrases ^[1]	R21/22	Harmful in contact with skin and if swallowed.
	R23	Toxic by inhalation.
	R32	Contact with acids liberates very toxic gas.
	R33	Danger of cumulative effects.
	R34	Causes burns.
	R40(3)	Limited evidence of a carcinogenic effect.
	R41	Risk of serious damage to eyes.
	R43	May cause SENSITISATION by skin contact.
	R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
	R58	May cause long-term adverse effects in the environment.
R63(3)	Possible risk of harm to the unborn child.	
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI	

Classification [1]	Flammable Liquids Category 4, Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 1A, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Inhalation) Category 3, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

Label elements

Hazard pictogram(s)	
Signal word	Danger

Hazard statement(s)

H227	Combustible liquid.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.
AUH032	Contact with acid liberates very toxic gas.

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist/vapours/spray.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If more than 15 mins from Doctor, INDUCE VOMITING (if conscious).
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/ attention.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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Label elements

Relevant risk statements are found in section 2

Indication(s) of danger	T
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Safety advice

S01	Keep locked up.
S02	Keep out of reach of children.
S04	Keep away from living quarters.
S13	Keep away from food, drink and animal feeding stuffs.
S20	When using do not eat or drink.

S21	When using do not smoke.
S23	Do not breathe gas/fumes/vapour/spray.
S26	In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.
S28	After contact with skin, wash immediately with plenty of water.
S29	Do not empty into drains.
S35	This material and its container must be disposed of in a safe way.
S36	Wear suitable protective clothing.
S37	Wear suitable gloves.
S38	In case of insufficient ventilation, wear suitable respiratory equipment.
S39	Wear eye/face protection.
S40	To clean the floor and all objects contaminated by this material, use water.
S41	In case of fire and/or explosion, DO NOT BREATHE FUMES.
S45	In case of accident or if you feel unwell IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
S46	If swallowed, seek medical advice immediately and show this container or label.
S50	Do not mix with acids, accelerators or promoters
S53	Avoid exposure - obtain special instructions before use.
S56	Dispose of this material and its container at hazardous or special waste collection point.
S57	Use appropriate container to avoid environmental contamination.
S61	Avoid release to the environment. Refer to special instructions/Safety data sheets.
S63	In case of accident by inhalation: remove casualty to fresh air and keep at rest.
S64	If swallowed, rinse mouth with water (only if the person is conscious).

Other hazards

Vapours potentially cause drowsiness and dizziness*.

SECTION 3 Composition / information on ingredients**Substances**

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
25322-68-3	30-60	<u>polyethylene glycol</u>
112-60-7	30-60	<u>tetraethylene glycol</u>
10222-01-2	10-30	<u>2,2-dibromo-3-nitropropionamide</u>
7647-15-6	0-10	<u>sodium bromide</u>
3252-43-5	0-10	<u>dibromoacetonitrile</u>
7732-18-5	10-30	<u>water</u>
Not Available		Headspace of drum may contain
506-68-3		<u>cyanogen bromide</u>
3252-43-5		<u>dibromoacetonitrile</u>

Legend: 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available

SECTION 4 First aid measures**Description of first aid measures**

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with 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. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.
Inhalation	<ul style="list-style-type: none"> ▶ 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. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.

	<ul style="list-style-type: none"> ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p>
Ingestion	<ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ 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. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- ▶ Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- ▶ Charcoal has no place in acid management.
- ▶ Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- ▶ Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- ▶ Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

- ▶ Polyethylene glycols are generally poorly absorbed orally and are mostly unchanged by the kidney.
- ▶ Dermal absorption can occur across damaged skin (e.g. through burns) leading to increased osmolality, anion gap metabolic acidosis, elevated calcium, low ionised calcium, CNS depression and renal failure.
- ▶ Treatment consists of supportive care.

[Ellenhorn and Barceloux: Medical Toxicology]

Treatment of intoxication by the bromide ion includes hydration, the maintenance of mild water diuresis, and sodium, or even better, ammonium chloride (10-15 gm. daily in divided doses) with an osmotic or high ceiling diuretic. Haemodialysis may be of value. [GOSSELIN, SMITH, HODGE: Clinical Toxicology of Commercial Products]

In acute poisoning the stomach should be emptied by aspiration and lavage and sodium chloride given by intravenous infusion. Dextrose has also been administered and frusemide may be given to aid diuresis. In severe cases of bromide intoxication or when usual treatments cannot be used haemodialysis or peritoneal dialysis may be of value. [MARTINDALE: The Extra Pharmacopoeia]

For cyanide intoxication (and for certain nitrites which produce cyanide ion)

- ▶ Signs symptoms of acute cyanide poisoning reflect cellular hypoxia and are often non-specific.
- ▶ Cyanosis may be a late finding.
- ▶ A *bradycardic*, hypertensive and tachypneic patient suggests poisoning especially if CNS and cardiovascular depression subsequently occurs.
- ▶ Immediate attention should be directed towards assisted ventilation, administration of 100% oxygen, insertion of intravenous lines and institution of cardiac monitoring.
- ▶ Obtain an arterial blood gas immediately and correct any severe metabolic acidosis (pH below 7.15).
- ▶ Mildly symptomatic patients generally require supportive care alone. Nitrites should not be given indiscriminately - in all cases of moderate to severe poisoning, they should be given in conjunction with thiosulfate. As a temporizing measure supply amyl nitrite perles (0.2ml inhaled 30 seconds every minute) until intravenous lines for sodium nitrite are established. 10 ml of a 3% solution is administered over 4 minutes to produce 20% methaemoglobin in adults. Follow directly with 50 ml of 25% sodium thiosulfate, at the same rate, IV. If symptoms reappear or persist within 1/2-1 hour, repeat nitrite and thiosulfate at 50% of initial dose. As the mode of action involves the metabolic conversion of the thiosulfate to thiocyanate, renal failure may enhance thiocyanate toxicity.
- ▶ Methylene blue is not an antidote. [Ellenhorn and Barceloux: Medical Toxicology]

If amyl nitrite intervention is employed then Medical Treatment Kits should contain the following:

- ▶ One box containing one dozen amyl nitrite ampoules
- ▶ Two sterile ampoules of sodium nitrite solution (10 mL of a 3% solution in each)
- ▶ Two sterile ampoules of sodium thiosulfate solution (50 mL of a 25% solution in each)
- ▶ One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles. One tourniquet.
- ▶ One dozen gauze pads.
- ▶ Latex gloves
- ▶ A "Biohazard" bag for disposal of bloody/contaminated equipment.
- ▶ A set of cyanide instructions on first aid and medical treatment.

- Notes on the use of amyl nitrite:-

- ▶ AN is highly volatile and flammable - do not smoke or use around a source of ignition.
- ▶ If treating patient in a windy or draughty area provide some shelter or protection (shirt, wall, drum, cupped hand etc.) to prevent amyl nitrite vapour from being blown away. Keep ampoule upwind from the nose, the objective is to get amyl nitrite into the patients lungs.
- ▶ Rescuers should avoid AN inhalation to avoid becoming dizzy and losing competence.
- ▶ Lay the patient down. Since AN dilates blood vessels and lowers blood pressure, lying down will help keep patient conscious.
- ▶ **DO NOT overuse - excessive use might put the patient into shock.** Experience at DuPont plants has not shown any serious after-effects from treatment with amyl nitrite.

ADDITIONAL NOTES:

- ▶ Major medical treatment procedures may vary e.g. US (FDA method as recommended by DuPont) uses amyl nitrite as a methaemoglobin generator, followed by treatment with sodium nitrite and then sodium thiosulfate.

MODES OF ACTION: Amyl nitrite (AN) reacts with haemoglobin (HB) to form about 5% methaemoglobin (MHB). Sodium nitrite (NaNO₂) reacts with haemoglobin to form

approximately 20-30% methaemoglobin. Methaemoglobin attracts cyanide ions (CN) from tissue and binds with them to become cyanmethaemoglobin (CNMHB). Sodium thiosulfate (Na₂S₂O₃) converts cyanmethaemoglobin to thiocyanate (HSCN) which is excreted by the kidneys. i.e. AN + HB = MHB NaNO₂ + HB = MHB CN + MHB = CNMHB Na₂S₂O₃ + CNMHB + O₂ = HSCN

- ▶ The administration of the antidote salts is intravenous in normal saline, Ringers lactate or other available IV fluid.
- ▶ European practice may use 4-dimethylaminophenol (DMAP) as a methaemoglobin generator. Also hydroxycobalamin (Vitamin B12a) is used. Hydroxycobalamin works by reacting with cyanide to form cyanocobalamin (Vitamin B12) which is excreted in the urine.
- ▶ European and Australian NOHSC (ASCC) propose dicobalt edetate (Kelocyanor) as antidote. This acts by chelating cyanide to form stable cobaltcyanide, which is excreted in the urine. In all cases hyperbaric therapy may increase the efficiency of a cyanide antidote kit.

SECTION 5 Firefighting measures

Extinguishing media

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

Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ▶ 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 fire fighting procedures suitable for surrounding area.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>Combustion products include: carbon monoxide (CO) carbon dioxide (CO₂) hydrogen bromide nitrogen oxides (NO_x) other pyrolysis products typical of burning organic material.</p>
HAZCHEM	2X

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Minor Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. ▶ 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	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ 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.

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

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ DO NOT USE brass or copper containers / stirrers ▶ 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. ▶ WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
Other information	<ul style="list-style-type: none"> ▶ Store in an upright position. ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials and foodstuff containers.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Check regularly for spills and leaks ▶ Glass container is suitable for laboratory quantities ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum.
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	<ul style="list-style-type: none"> ▶ Packing as recommended by manufacturer. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> ▶ Removable head packaging; ▶ Cans with friction closures and ▶ low pressure tubes and cartridges <p>may be used.</p>
Storage incompatibility	<ul style="list-style-type: none"> ▶ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. <p>Alcohols</p> <ul style="list-style-type: none"> ▶ are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. ▶ reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen ▶ react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzincs, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium ▶ should not be heated above 49 deg. C. when in contact with aluminium equipment ▶ Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
polyethylene glycol	30 mg/m3	1,300 mg/m3	7,700 mg/m3
tetraethylene glycol	87 mg/m3	960 mg/m3	5,700 mg/m3
sodium bromide	12 mg/m3	130 mg/m3	830 mg/m3
cyanogen bromide	24 mg/m3	44 mg/m3	200 mg/m3

Ingredient	Original IDLH	Revised IDLH
polyethylene glycol	Not Available	Not Available
tetraethylene glycol	Not Available	Not Available
2,2-dibromo-3-nitrilopropionamide	Not Available	Not Available
sodium bromide	Not Available	Not Available
dibromoacetoneitrile	Not Available	Not Available
water	Not Available	Not Available
cyanogen bromide	25 mg/m3	Not Available
dibromoacetoneitrile	Not Available	Not Available


Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
tetraethylene glycol	E	≤ 0.1 ppm
2,2-dibromo-3-nitrilopropionamide	E	≤ 0.01 mg/m ³
sodium bromide	E	≤ 0.01 mg/m ³
dibromoacetoneitrile	E	≤ 0.1 ppm
dibromoacetoneitrile	E	≤ 0.1 ppm

Notes:

Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

Exposure controls

Appropriate engineering controls	<p>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 independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>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.</p>
Individual protection measures, such as personal protective equipment	
Eye and face protection	<ul style="list-style-type: none"> ▶ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ▶ Full face shield may be required for supplementary but never for primary protection of eyes. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.

Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> ▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber ▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. <p>NOTE:</p> <ul style="list-style-type: none"> ▶ 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. <p>The selection of 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.</p> <p>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.</p> <p>Personal hygiene is a key element of effective hand care.</p>
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Eyewash unit.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Spirax Sarco Delta 987

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Ansell Glove Selection

Glove — In order of recommendation
AlphaTec® Solvex® 37-185
AlphaTec® 58-008
AlphaTec® 58-530B
AlphaTec® 58-530W
AlphaTec® 58-735
AlphaTec® 79-700
AlphaTec® Solvex® 37-675
MICROFLEX® 93-260
AlphaTec® 53-001
AlphaTec® 58-005

The suggested gloves for use should be confirmed with the glove supplier.

Respiratory protection

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

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AB-AUS / Class1 P2	-
up to 50	1000	-	AB-AUS / Class 1 P2
up to 50	5000	Airline *	-
up to 100	5000	-	AB-2 P2
up to 100	10000	-	AB-3 P2
100+			Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

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SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Clear light yellow to amber mildly acidic liquid with slight unpleasant odour; mixes with water.		
Physical state	Liquid	Relative density (Water = 1)	1.20-1.30
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	2	Decomposition temperature (°C)	Not Available

Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	>70 decomposes	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	> 80 (COC)	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Combustible.	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Negligible	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Contact with alkaline material liberates heat ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. 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.</p> <p>The very low volatility of polyethylene glycols (PEGs) make inhalation exposure unlikely, other than in the form of mist, which may be formed by violent agitation at high temperatures. No adverse effects have been reported with inhalation.</p> <p>Exposure by inhalation at high concentrations of cyanogen bromide may cause death. However, as cyanogen bromide is extremely irritating it is unlikely that anyone would voluntarily remain in areas with high enough concentrations to exert a cyanide effect.</p> <p>Inhalation/ingestion exposure symptoms include weakness, headache, giddiness, dizziness, confusion, anxiety, nausea and vomiting. In severe cases breathing is rapid and deep then becomes slow and gasping; an irregular heartbeat and tightness in the chest may be experienced. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.</p> <p>Aliphatic alcohols with more than 3-carbons cause headache, dizziness, drowsiness, muscle weakness and delirium, central depression, coma, seizures and behavioural changes. Secondary respiratory depression and failure, as well as low blood pressure and irregular heart rhythms, may follow.</p> <p>Inhalation hazard is increased at higher temperatures.</p> <p>Exposure by inhalation to 2,2-dibromo-3-nitropropionamide (DBNPA) at high concentrations may cause death. However, the hydrolysis product, cyanogen bromide, is so irritating that it is unlikely that anyone would remain in an area with a high concentration of DBNPA. Symptoms caused by inhalation or swallowing include weakness, headache, giddiness, confusion, anxiety, nausea and vomiting. In severe cases, breathing is rapid and deep and then becomes slow and gasping; an irregular heartbeat and tightness in the chest may be experienced.</p>
Ingestion	<p>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.</p> <p>The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.</p> <p>If swallowed, the toxic effects of glycols (dihydric alcohols) are similar to those of alcohol, with depression of the central nervous system, nausea, vomiting, and degenerative changes in the liver and kidney.</p> <p>Nitrile poisoning exhibits similar symptoms to poisoning due to hydrogen cyanide. The substances irritate the eyes and skin, and are absorbed quickly and completely through the skin.</p> <p>Although the polyethylene glycols (PEGs) have extremely low toxicity if swallowed, toxicity increases as the molecular weight increases. Overexposure to non-ring alcohols causes nervous system symptoms. These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma.</p> <p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.</p> <p>Metabolic studies on animals indicate that 2,2-dibromo-3-nitropropionamide (DBNPA) is metabolized and excreted in the urine, to a substantial degree, within 24 hours. In contact with water the substance slowly decomposes to form toxic fumes of cyanogens bromide and dibromoacetoneitrile. Animal studies showed that giving DBNPA caused only changes in weight to certain organs, such as the spleen, thymus and liver, as well as reduced body weight gain in growing animals.</p> <p>Gavage of dibromoacetoneitrile (23-180 mg/kg/day for 14 days) produced 100% mortality in rats in the higher dose group and 20-40% mortality at 90 mg/kg. The only toxic syndrome produced was a decrease in the weight of spleen and thymus in male animals and an increase in liver weights amongst female rats. All animals exhibited a dose-dependent depression of weight gain. 7.7% of the dose is excreted as thiocyanate in the urine in 24 hours.</p>
Skin Contact	<p>Skin contact with the material may be harmful; systemic effects may result following absorption.</p> <p>The material can produce chemical burns following direct contact with the skin.</p> <p>Polyethylene glycols (PEGs) may be absorbed by the skin but no toxic effects have been noted and sensitization does not occur. This material may increase the absorption activity or toxicity of other ingredients in a mixture. (Source: Genium)</p> <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man.</p>

	<p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>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.</p> <p>DBNPA is a skin sensitiser, and workers who show typical symptoms should not be allowed to come into further contact with the material.</p>												
Eye	<p>The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.</p> <p>If applied to the eyes, this material causes severe eye damage.</p> <p>On eye contact, the polyethylene glycols will cause slight, temporary pain and irritation to the conjunctiva, although no permanent damage. The effects are described as similar to those produced by mild soap.</p> <p>Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.</p> <p>Exposure by skin or eye contact to cyanogens bromide is severely irritating, and may cause second or third degree burns and permanent damage to the eyes.</p>												
Chronic	<p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.</p> <p>Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother.</p> <p>There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.</p> <p>Chronic exposure to cyanides and certain nitriles may result in interference to iodine uptake by thyroid gland and its consequent enlargement.</p> <p>This occurs following metabolic conversion of the cyanide moiety to thiocyanate.</p> <p>Polyethylene glycols appear to act as slow acting substances with parasympathetic-like effects. If given through a vein, they may increase the tendency of blood to clot and if given rapidly, can cause death from blood clot formation. It is not believed that they break down to form ethylene glycol.</p> <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p> <p>Chronic poisoning from ionic bromides has historically resulted from medical use of bromides but not from exposure in the environment or workplace. In the absence of other signs of poisoning, there may be depression, hallucinations and schizophrenia-like psychosis. Bromides may also cause sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness, inability to speak, difficulty speaking, weakness, fatigue, a spinning sensation, stupor, coma, decreased appetite, nausea, vomiting, an acne-like rash on the face (bronchoderma), legs and trunk, swelling of the bronchi and a profuse discharge from the nostrils. There may also be inco-ordination and very brisk reflexes.</p> <p>Animal testing suggests that dibromoacetonitrile may lead to lung tumours. An increase in the incidence of animals with benign and malignant skin tumours has been reported.</p> <p>Animal testing shows that oral administration with dibromoacetonitrile over extended periods may cause lung tumours. When applied to the skin, skin tumours did not result unless an initiator (a phorbol ester) was applied, where an increased incidence of skin tumours including squamous cell cancers was reported.</p>												
Spirax Sarco Delta 987	<table border="1"> <thead> <tr> <th>TOXICITY</th> <th>IRRITATION</th> </tr> </thead> <tbody> <tr> <td>Not Available</td> <td>Not Available</td> </tr> </tbody> </table>	TOXICITY	IRRITATION	Not Available	Not Available								
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cyanogen bromide	TOXICITY	IRRITATION
	Not Available	Not Available
dibromoacetonitrile	TOXICITY	IRRITATION
	Oral (Rat) LD50: 245 mg/kg ^[2]	Not Available

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

POLYETHYLENE GLYCOL	<p>for molecular weights (200-8000) * Oral (rat) LD50: 31000->50000 mg/kg Oral (mice) LD50: 38000->50000 mg/kg Oral (g.pig) LD50: 17000->50000 mg/kg Oral (rabbit) LD50: 14000->50000 mg/kg * AIHA WEEL Guides Intraperitoneal (mice) LD50: 3100-12900 mg/kg</p> <p>For polyethylene glycols: Pure polyethylene glycols have essentially similar toxicity, with the lighter species being more toxic. Absorption from the digestive tract decreases with increasing molecular weight. Polyethylene glycols do not have sensitizing and irritating properties on skin, however, allergic reactions (which can present as hives), sometimes delayed, may occur with some lighter species. Polyethers (such as ethoxylated surfactants and polyethylene glycols) are highly susceptible to being oxidized in the air. They then form complex mixtures of oxidation products. Animal testing reveals that whole the pure, non-oxidised surfactant is non-sensitizing, many of the oxidation products are sensitizers. The oxidization products also cause irritation.</p>
TETRAETHYLENE GLYCOL	<p>Reproductive effector in rats. 3head Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).</p>
2,2-DIBROMO-3-NITRILOPROPIONAMIDE	<p>** Registration Eligibility Decision (RED) US EPA The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. For 2,2-dibromo-3-nitripropionamide (DBNPA): Several human incident reports have been reported. These include eye, throat and respiratory irritation, runny nose, and headache. Generally the effects arose with spills or misuse. Acute toxicity: When fed to rats, rabbits and guinea pigs, the animals showed depression, prostration, and labored breathing, along with weight loss in some cases . When administered to rabbit skin, dermal irritation (moderate to severe hyperemia/edema and slight to marked necrosis), was observed in all treated animals. A primary eye irritation study in rabbits resulted in severe corneal damage, which was considered permanent, in all treated eyes In another eye irritation study in rabbits DBNPA was corrosive to the eyes, with maximum opacity within one hour. Rabbits treated with DBNPA in a primary dermal irritation study (4-hr exposure to 0.5 g) experienced erythema and edema, with exfoliation after five days. Two dermal sensitization studies with guinea pigs found DBNPA to be a weak sensitizer. Subchronic Toxicity: In a subchronic toxicity study, rats were given DBNPA for 90 days by gavage at doses of 0, 5, 13, or 30 mg/kg/day.</p>
POLYETHYLENE GLYCOL & TETRAETHYLENE GLYCOL	<p>The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. 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.</p>
TETRAETHYLENE GLYCOL & 2,2-DIBROMO-3-NITRILOPROPIONAMIDE & SODIUM BROMIDE & DIBROMOACETONITRILE & CYANOGEN BROMIDE	<p>Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.</p>
SODIUM BROMIDE & WATER	<p>No significant acute toxicological data identified in literature search.</p>
DIBROMOACETONITRILE	<p>In one study in mice, administration of dibromoacetonitrile in the drinking-water increased the incidence of squamous-cell papilloma or carcinoma (combined) of the forestomach in males and of squamous-cell papilloma of the forestomach in females. In one study in rats, administration of dibromoacetonitrile in the drinking-water increased the incidence of glandular stomach adenoma, and of squamous-cell papilloma or carcinoma (combined) and squamous-cell carcinoma of the oral cavity (oral mucosa or tongue) in males. Squamous-cell tumours of the forestomach and squamous-cell carcinomas of the oral cavity are rare spontaneous neoplasms in experimental animals. The mechanisms that lead to the carcinogenicity of dibromoacetonitrile are not known. Some findings suggest that covalent binding occurs in tissues such as the stomach and liver, possibly following GSH-mediated activation. Oxidative stress associated with reduced GSH levels and deficiency in GST activity and/ or binding to protein may also be involved. Dibromoacetonitrile may also act via a genotoxic mechanism For acid mists, aerosols, vapours Test results suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airway from direct exposure to inhaled acidic mists (which also protects the stomach lining from the hydrochloric acid secreted there). Animal testing shows that halogenated acetonitriles have an oral semilethal dose of 245-361 mg/kg of body weight. They are metabolised to carbon dioxide and cyanide, which is then further metabolised to thiocyanate. These substances may be formed after swallowing chlorinated water. These substances can cause genetic damage or mutations, and can increase the rate of skin cancers.</p> <p>WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.</p>

Acute Toxicity	✓	Carcinogenicity	✓
Skin Irritation/Corrosion	✓	Reproductivity	✓
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✓	STOT - Repeated Exposure	✓
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ – Data either not available or does not fill the criteria for classification

✔ – Data available to make classification

SECTION 12 Ecological information

Toxicity

Spirax Sarco Delta 987	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
polyethylene glycol	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	48h	Crustacea	>100mg/l	2
	EC50	96h	Algae or other aquatic plants	>100mg/l	2
	EC50(ECx)	48h	Crustacea	>100mg/l	2
LC50	96h	Fish	>100mg/l	2	
tetraethylene glycol	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
	EC50	48h	Crustacea	>1000mg/l	1
	EC50	96h	Algae or other aquatic plants	>1000mg/l	1
	LC50	96h	Fish	62mg/l	2
EC50(ECx)	96h	Algae or other aquatic plants	>1000mg/l	1	
2,2-dibromo-3-nitropropionamide	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	48h	Crustacea	1.333-2.38mg/L	4
	LC50	96h	Fish	1.166-1.476mg/L	4
NOEC(ECx)	672h	Crustacea	0.119mg/L	4	
sodium bromide	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	8mg/l	2
	EC50	48h	Crustacea	>100048mg/l	1
	EC50	96h	Algae or other aquatic plants	5800-24000mg/L	1
	LC50	96h	Fish	>440mg/l	2
NOEC(ECx)	48h	Crustacea	100048mg/l	1	
dibromoacetonitrile	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	0.55mg/l	Not Available
water	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
cyanogen bromide	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	15mg/l	Not Available
	EC50	72h	Algae or other aquatic plants	~0.708mg/l	2
	EC50	48h	Crustacea	~0.038mg/l	2
EC50(ECx)	48h	Crustacea	~0.038mg/l	2	
dibromoacetonitrile	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	0.55mg/l	Not Available
Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

On the basis of available evidence concerning either toxicity, persistence, potential to accumulate and/or observed environmental fate and behaviour, the material may present a danger, immediate or long-term and/or delayed, to the structure and/or functioning of natural ecosystems.

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

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
polyethylene glycol	LOW	LOW
tetraethylene glycol	LOW	LOW

Continued...

Ingredient	Persistence: Water/Soil	Persistence: Air
2,2-dibromo-3-nitrilopropionamide	HIGH	HIGH
sodium bromide	HIGH	HIGH
dibromoacetonitrile	HIGH	HIGH
water	LOW	LOW
cyanogen bromide	HIGH	HIGH
dibromoacetonitrile	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
polyethylene glycol	LOW (LogKOW = -1.1996)
tetraethylene glycol	LOW (LogKOW = -2.0228)
2,2-dibromo-3-nitrilopropionamide	LOW (LogKOW = 0.82)
sodium bromide	LOW (LogKOW = -0.3713)
dibromoacetonitrile	LOW (LogKOW = 0.468)
cyanogen bromide	LOW (LogKOW = -0.2931)
dibromoacetonitrile	LOW (LogKOW = 0.468)



Mobility in soil

Ingredient	Mobility
polyethylene glycol	HIGH (KOC = 1)
tetraethylene glycol	LOW (KOC = 10)
2,2-dibromo-3-nitrilopropionamide	LOW (KOC = 8.978)
sodium bromide	LOW (KOC = 14.3)
dibromoacetonitrile	LOW (KOC = 12.83)
cyanogen bromide	LOW (KOC = 4.5)
dibromoacetonitrile	LOW (KOC = 12.83)

SECTION 13 Disposal considerations**Waste treatment methods**

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Recycle wherever possible. ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▶ Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus ▶ Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water.
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SECTION 14 Transport information**Labels Required**

	
Marine Pollutant	
HAZCHEM	2X

Land transport (ADG)

14.1. UN number or ID number	3265				
14.2. UN proper shipping name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains 2,2-dibromo-3-nitrilopropionamide)				
14.3. Transport hazard class(es)	<table border="1"> <tbody> <tr> <td>Class</td> <td>8</td> </tr> <tr> <td>Subsidiary Hazard</td> <td>Not Applicable</td> </tr> </tbody> </table>	Class	8	Subsidiary Hazard	Not Applicable
Class	8				
Subsidiary Hazard	Not Applicable				
14.4. Packing group	II				

14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Special provisions	274
	Limited quantity	1 L

Air transport (ICAO-IATA / DGR)

14.1. UN number	3265	
14.2. UN proper shipping name	Corrosive liquid, acidic, organic, n.o.s. * (contains 2,2-dibromo-3-nitropropionamide)	
14.3. Transport hazard class(es)	ICAO/IATA Class	8
	ICAO / IATA Subsidiary Hazard	Not Applicable
	ERG Code	8L
14.4. Packing group	II	
14.5. Environmental hazard	Environmentally hazardous	
14.6. Special precautions for user	Special provisions	A3 A803
	Cargo Only Packing Instructions	855
	Cargo Only Maximum Qty / Pack	30 L
	Passenger and Cargo Packing Instructions	851
	Passenger and Cargo Maximum Qty / Pack	1 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y840
	Passenger and Cargo Limited Maximum Qty / Pack	0.5 L

Sea transport (IMDG-Code / GGVSee)

14.1. UN number	3265	
14.2. UN proper shipping name	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains 2,2-dibromo-3-nitropropionamide)	
14.3. Transport hazard class(es)	IMDG Class	8
	IMDG Subsidiary Hazard	Not Applicable
14.4. Packing group	II	
14.5. Environmental hazard	Marine Pollutant	
14.6. Special precautions for user	EMS Number	F-A, S-B
	Special provisions	274
	Limited Quantities	1 L

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
polyethylene glycol	Not Available
tetraethylene glycol	Not Available
2,2-dibromo-3-nitropropionamide	Not Available
sodium bromide	Not Available
dibromoacetonitrile	Not Available
water	Not Available
cyanogen bromide	Not Available
dibromoacetonitrile	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
polyethylene glycol	Not Available
tetraethylene glycol	Not Available
2,2-dibromo-3-nitropropionamide	Not Available
sodium bromide	Not Available
dibromoacetonitrile	Not Available
water	Not Available
cyanogen bromide	Not Available

Product name	Ship Type
dibromoacetonitrile	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

polyethylene glycol is found on the following regulatory lists

- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 3
- Australian Inventory of Industrial Chemicals (AIIC)

tetraethylene glycol is found on the following regulatory lists

- Australian Inventory of Industrial Chemicals (AIIC)

2,2-dibromo-3-nitropropionamide is found on the following regulatory lists

- Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
- Australian Inventory of Industrial Chemicals (AIIC)

sodium bromide is found on the following regulatory lists

- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
- Australian Inventory of Industrial Chemicals (AIIC)

dibromoacetonitrile is found on the following regulatory lists

- Chemical Footprint Project - Chemicals of High Concern List
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

water is found on the following regulatory lists

- Australian Inventory of Industrial Chemicals (AIIC)

cyanogen bromide is found on the following regulatory lists

- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
- Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7
- Australian Inventory of Industrial Chemicals (AIIC)

dibromoacetonitrile is found on the following regulatory lists

- Chemical Footprint Project - Chemicals of High Concern List
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
- International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

Additional Regulatory Information

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (dibromoacetonitrile; dibromoacetonitrile)
Canada - DSL	No (2,2-dibromo-3-nitropropionamide; dibromoacetonitrile; dibromoacetonitrile)
Canada - NDSL	No (polyethylene glycol; tetraethylene glycol; sodium bromide; water; cyanogen bromide)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (dibromoacetonitrile; dibromoacetonitrile)
Korea - KECI	No (dibromoacetonitrile; dibromoacetonitrile)
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (polyethylene glycol; tetraethylene glycol; dibromoacetonitrile; dibromoacetonitrile)
Vietnam - NCI	Yes
Russia - FBEPH	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	10/03/2023
Initial Date	02/05/2005

SDS Version Summary

Version	Date of Update	Sections Updated
8.1	10/12/2021	Classification change due to full database hazard calculation/update.
9.1	10/03/2023	Classification change due to full database hazard calculation/update.

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.

The 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. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

- ▶ PC - TWA: Permissible Concentration-Time Weighted Average
- ▶ PC - STEL: Permissible Concentration-Short Term Exposure Limit
- ▶ IARC: International Agency for Research on Cancer
- ▶ ACGIH: American Conference of Governmental Industrial Hygienists
- ▶ STEL: Short Term Exposure Limit
- ▶ TEEL: Temporary Emergency Exposure Limit,
- ▶ IDLH: Immediately Dangerous to Life or Health Concentrations
- ▶ ES: Exposure Standard
- ▶ OSF: Odour Safety Factor
- ▶ NOAEL: No Observed Adverse Effect Level
- ▶ LOAEL: Lowest Observed Adverse Effect Level
- ▶ TLV: Threshold Limit Value
- ▶ LOD: Limit Of Detection
- ▶ OTV: Odour Threshold Value
- ▶ BCF: BioConcentration Factors
- ▶ BEI: Biological Exposure Index
- ▶ DNEL: Derived No-Effect Level
- ▶ PNEC: Predicted no-effect concentration

- ▶ AIIC: Australian Inventory of Industrial Chemicals
- ▶ DSL: Domestic Substances List
- ▶ NDSL: Non-Domestic Substances List
- ▶ IECSC: Inventory of Existing Chemical Substance in China
- ▶ EINECS: European INventory of Existing Commercial chemical Substances
- ▶ ELINCS: European List of Notified Chemical Substances
- ▶ NLP: No-Longer Polymers
- ▶ ENCS: Existing and New Chemical Substances Inventory
- ▶ KECl: Korea Existing Chemicals Inventory
- ▶ NZIoC: New Zealand Inventory of Chemicals
- ▶ PICCS: Philippine Inventory of Chemicals and Chemical Substances
- ▶ TSCA: Toxic Substances Control Act
- ▶ TCSI: Taiwan Chemical Substance Inventory
- ▶ INSQ: Inventario Nacional de Sustancias Químicas
- ▶ NCI: National Chemical Inventory
- ▶ FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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