



Method 8330 - Explosives by HPLC

Novachem Pty Ltd

Version No: 1.1

Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Chemwatch Hazard Alert Code: 4

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

Product Identifier

Product name	Method 8330 - Explosives by HPLC
Synonyms	Not Available
Proper shipping name	FLAMMABLE LIQUID, N.O.S. (contains acetonitrile and methanol)
Other means of identification	M-8330-R-0.1X

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

Relevant identified uses	Laboratory Chemical Reference Material
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Details of the manufacturer or supplier of the safety data sheet

Registered company name	Novachem Pty Ltd	Novachem Pty Ltd
Address	25 Crissane Road, Heidelberg West Victoria 3081 Australia	25 Crissane Road, Heidelberg West Victoria 3081 Australia
Telephone	+61384151255	+61384151255
Fax	+61386250088	+61386250088
Website	www.novachem.com.au	www.novachem.com.au
Email	novachem@novachem.com.au	novachem@novachem.com.au

Emergency telephone number

Association / Organisation	Victorian Poisons Information Centre	Victorian Poisons Information Centre
Emergency telephone numbers	13 11 26	13 11 26
Other emergency telephone numbers	Not Available	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Flammable Liquids Category 2, Acute Toxicity (Oral) Category 3, Acute Toxicity (Dermal) Category 3, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Acute Toxicity (Inhalation) Category 3, Specific Target Organ Toxicity - Single Exposure (Narcotic Effects) Category 3, Reproductive Toxicity Category 1B, Specific Target Organ Toxicity - Single Exposure Category 1, Specific Target Organ Toxicity - Repeated Exposure Category 2
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)

H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H315	Causes skin irritation.

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H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H336	May cause drowsiness or dizziness.
H360D	May damage the unborn child.
H370	Causes damage to organs.
H373	May cause damage to organs through prolonged or repeated exposure.

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+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P308+P311	IF exposed or concerned: Call a POISON CENTER/doctor/physician/first aider.
P330	Rinse mouth.
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam to extinguish.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
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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SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
35572-78-2	0.01	<u>2-amino-4,6-dinitrotoluene</u>
19406-51-0	0.01	<u>4-amino-2,6-dinitrotoluene</u>
99-65-0	0.01	<u>m-dinitrobenzene</u>
121-14-2*	0.01	<u>2,4-Dinitrotoluene</u>
606-20-2	0.01	<u>2,6-dinitrotoluene</u>
2691-41-0	0.01	<u>cyclotetramethylenetetranitramine</u>
121-82-4	0.01	<u>cyclotrimethylenetrinitramine</u>
98-95-3	0.01	<u>nitrobenzene</u>
88-72-2	0.01	<u>o-nitrotoluene</u>
99-08-1	0.01	<u>m-nitrotoluene</u>
99-99-0	0.01	<u>p-nitrotoluene</u>
479-45-8	0.01	<u>tetryl</u>
118-96-7	0.01	<u>trinitrotoluene (TNT)</u>
99-35-4	0.01	<u>trinitrobenzene</u>
67-56-1	49.93	<u>methanol</u>
75-05-8	49.93	<u>acetonitrile</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.
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Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Quickly but gently, wipe material off skin with a dry, clean cloth. ▶ Immediately 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.
Ingestion	<ul style="list-style-type: none"> ▶ 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. ▶ Seek medical advice. ▶ 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.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute and short term repeated exposures to methanol:

- Toxicity results from accumulation of formaldehyde/formic acid.
- Clinical signs are usually limited to CNS, eyes and GI tract. Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.
- Stabilise obtunded patients by giving naloxone, glucose and thiamine.
- Decontaminate with Ipecac or lavage for patients presenting 2 hours post-ingestion. Charcoal does not absorb well; the usefulness of cathartic is not established.
- Forced diuresis is not effective; haemodialysis is recommended where peak methanol levels exceed 50 mg/dL (this correlates with serum bicarbonate levels below 18 mEq/L).
- Ethanol, maintained at levels between 100 and 150 mg/dL, inhibits formation of toxic metabolites and may be indicated when peak methanol levels exceed 20 mg/dL. An intravenous solution of ethanol in D5W is optimal.
- Folate, as leucovorin, may increase the oxidative removal of formic acid. 4-methylpyrazole may be an effective adjunct in the treatment. 8-Phenytoin may be preferable to diazepam for controlling seizure.

[Ellenhorn Barceloux: Medical Toxicology]

Methanol poisoning can be treated with fomepizole, or if unavailable, ethanol. Both drugs act to reduce the action of alcohol dehydrogenase on methanol by means of competitive inhibition. Ethanol, the active ingredient in alcoholic beverages, acts as a competitive inhibitor by more effectively binding and saturating the alcohol dehydrogenase enzyme in the liver, thus blocking the binding of methanol. Methanol is excreted by the kidneys without being converted into the very toxic metabolites formaldehyde and formic acid. Alcohol dehydrogenase instead enzymatically converts ethanol to acetaldehyde, a much less toxic organic molecule. Additional treatment may include sodium bicarbonate for metabolic acidosis, and hemodialysis or hemodiafiltration to remove methanol and formate from the blood. Folinic acid or folic acid is also administered to enhance the metabolism of formate.

BIOLOGICAL EXPOSURE INDEX - BEI

Determinant	Index	Sampling Time	Comment
1. Methanol in urine	15 mg/l	End of shift	B, NS
2. Formic acid in urine	80 mg/gm creatinine	Before the shift at end of workweek	B, NS

B: Background levels occur in specimens collected from subjects **NOT** exposed.

NS: Non-specific determinant - observed following exposure to other materials.

For cyanide intoxication (and for certain nitriles 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.

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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

Water may be an ineffective extinguishing media for methanol fires; static explosions are reported for aqueous solutions as dilute as 30%. Water may be used to cool containers.

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 breathing apparatus plus protective gloves in the event of a fire. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ Use fire fighting procedures suitable for surrounding area.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Liquid and vapour are highly flammable. ▶ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▶ Vapour may travel a considerable distance to source of ignition. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. <p>Combustion products include: carbon dioxide (CO₂) formaldehyde nitrogen oxides (NO_x) other pyrolysis products typical of burning organic material.</p>
HAZCHEM	*3YE

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment.
Major Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ DO NOT touch the spill material <p>For alkyl nitriles: For residue:</p> <ul style="list-style-type: none"> ▶ Add alkaline hypochlorite solution to spill to produce cyanate. ▶ Neutralise liquid, and absorb with sawdust. ▶ Collect solid residues and seal in drums for disposal. ▶ Wash spill area with large quantities of water.

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"> ▶ 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.
Other information	<ul style="list-style-type: none"> ▶ 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

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<p>Suitable container</p>	<ul style="list-style-type: none"> ▶ Glass container is suitable for laboratory quantities ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ 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 may be used. <p>All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.</p>
<p>Storage incompatibility</p>	<p>Methanol:</p> <ul style="list-style-type: none"> ▶ reacts violently with strong oxidisers, acetyl bromide, alkyl aluminium salts, beryllium dihydride, bromine, chromic acid, 1-chloro-3,3-difluoro-2-methoxycyclopropene, cyanuric chloride, diethylzinc, isophthaloyl chloride, nitric acid, perchloric acid, potassium-tert-butoxide, potassium sulfur diimide, Raney nickel catalysts, 2,4,6-trichlorotriazine, triethylaluminium, 1,3,3-trifluoro-2-methoxycyclopropene ▶ is incompatible with strong acids, strong caustics, alkaline earth and alkali metals, aliphatic amines, acetaldehyde, benzoyl peroxide, 1,3-bis(di-n-cyclopentadienyl iron)-2-propen-1-one, calcium carbide, chloroform, chromic anhydride, chromium trioxide, dialkylzinc, dichlorine oxide, dichloromethane, ethylene oxide, hypochlorous acid, isocyanates, isopropyl chlorocarbonate, lithium tetrahydroaluminate, magnesium, methyl azide, nitrogen dioxide, palladium, pentafluoroguanidine, perchloryl fluoride, phosphorus pentasulfide, phosphorus trioxide, potassium, tangerine oil, triisobutylaluminium ▶ mixtures with lead perchlorate, sodium hypochlorite are explosive ▶ may react with metallic aluminium at high temperatures ▶ slowly corrodes lead and aluminium ▶ may generate electrostatic charges, due to low conductivity, on flow or agitation ▶ attacks some plastics, rubber and coatings. <p>Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content</p> <p>Acetonitrile</p> <ul style="list-style-type: none"> ▶ forms cyanide gas on contact with steam ▶ reacts violently with oxidisers such as chlorine, bromine, fluorine; with chlorosulfonic acid, oleum or sulfuric acid ▶ is incompatible with water (especially if acid or alkaline), acids, caustics, nitrating agents, indium, nitrogen tetroxide, sulfur trioxide, iron(III) salts of perchlorate, nitrogen fluoride compounds ▶ attacks most rubber and plastics ▶ may accumulate electrical charges, causing ignition of vapours ▶ Contact with acids produces toxic fumes ▶ Nitriles may polymerise in the presence of metals and some metal compounds. ▶ They are incompatible with acids; mixing nitriles with strong oxidising acids can lead to extremely violent reactions. ▶ Nitriles are generally incompatible with other oxidising agents such as peroxides and epoxides. ▶ The combination of bases and nitriles can produce hydrogen cyanide. ▶ The covalent cyano group is endothermic and many organic nitriles are reactive under certain conditions; N-cyano derivatives are reactive or unstable. ▶ The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation. ▶ Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds. <p>BREThERICK L.: Handbook of Reactive Chemical Hazards</p> <p>WARNING:</p> <p>May decompose violently or explosively on contact with other substances.</p> <ul style="list-style-type: none"> ▶ This substance, or one of its components, is one of the relatively few compounds which are described as "endothermic" i.e. heat is absorbed into the compound, rather than released from it, during its formation. ▶ The majority of endothermic compounds are thermodynamically unstable and may decompose explosively under various circumstances of initiation. ▶ Many but not all endothermic compounds have been involved in decompositions, reactions and explosions and, in general, compounds with significantly positive values of standard heats of formation, may be considered suspect on stability grounds. <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, dialkylzinc, 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 ▶ Avoid storage with reducing agents.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	m-dinitrobenzene	m-Dinitrobenzene	0.15 ppm / 1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	cyclotrimethylenetrinitramine	Cyclonite	1.5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nitrobenzene	Nitrobenzene	1 ppm / 5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	o-nitrotoluene	2-Nitrotoluene	2 ppm / 11 mg/m3	Not Available	Not Available	Not Available

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	m-nitrotoluene	3-Nitrotoluene	2 ppm / 11 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	p-nitrotoluene	4-Nitrotoluene	2 ppm / 11 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	tetryl	Tetryl	1.5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	trinitrotoluene (TNT)	2,4,6-Trinitrotoluene (TNT)	0.5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	methanol	Methyl alcohol	200 ppm / 262 mg/m3	328 mg/m3 / 250 ppm	Not Available	Not Available
Australia Exposure Standards	acetonitrile	Acetonitrile	40 ppm / 67 mg/m3	101 mg/m3 / 60 ppm	Not Available	Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
2-amino-4,6-dinitrotoluene	4.2 mg/m3	46 mg/m3	280 mg/m3
m-dinitrobenzene	3 mg/m3	33 mg/m3	200 mg/m3
2,4-Dinitrotoluene	0.6 mg/m3	12 mg/m3	200 mg/m3
2,6-dinitrotoluene	0.6 mg/m3	47 mg/m3	200 mg/m3
cyclotetramethylenetetranitramine	19 mg/m3	210 mg/m3	1,300 mg/m3
cyclotrimethylenetrinitramine	3 mg/m3	26 mg/m3	160 mg/m3
nitrobenzene	3 ppm	20 ppm	200 ppm
o-nitrotoluene	6 ppm	33 ppm	200 ppm
m-nitrotoluene	6 ppm	14 ppm	200 ppm
p-nitrotoluene	6 ppm	33 ppm	200 ppm
tetryl	4.5 mg/m3	14 mg/m3	1,300 mg/m3
trinitrotoluene (TNT)	0.3 mg/m3	17 mg/m3	1,000 mg/m3
trinitrobenzene	1.5 mg/m3	16 mg/m3	54 mg/m3
methanol	Not Available	Not Available	Not Available
acetonitrile	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
2-amino-4,6-dinitrotoluene	Not Available	Not Available
4-amino-2,6-dinitrotoluene	Not Available	Not Available
m-dinitrobenzene	50 mg/m3	Not Available
2,4-Dinitrotoluene	Not Available	Not Available
2,6-dinitrotoluene	Not Available	Not Available
cyclotetramethylenetetranitramine	Not Available	Not Available
cyclotrimethylenetrinitramine	Not Available	Not Available
nitrobenzene	200 ppm	Not Available
o-nitrotoluene	200 ppm	Not Available
m-nitrotoluene	200 ppm	Not Available
p-nitrotoluene	200 ppm	Not Available
tetryl	750 mg/m3	Not Available
trinitrotoluene (TNT)	500 mg/m3	Not Available
trinitrobenzene	Not Available	Not Available
methanol	6,000 ppm	Not Available
acetonitrile	500 ppm	137 ppm

Occupational Exposure Banding


Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
2-amino-4,6-dinitrotoluene	E	≤ 0.01 mg/m³
4-amino-2,6-dinitrotoluene	E	≤ 0.01 mg/m³
2,4-Dinitrotoluene	E	≤ 0.01 mg/m³
2,6-dinitrotoluene	E	≤ 0.01 mg/m³
cyclotetramethylenetetranitramine	E	≤ 0.01 mg/m³
trinitrobenzene	E	≤ 0.01 mg/m³

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

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Appropriate 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 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.
Individual protection measures, such as personal protective equipment	
Eye and face protection	<ul style="list-style-type: none"> ▸ Safety glasses with side shields. ▸ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent] ▸ 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 for acetonitrile: Butyl rubber, PVAL, Teflon, Saranex, Silvershield, Viton/ chlorobutyl are all highly resistant to permeation
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▸ Overalls. ▸ Eyewash unit. ▸ Barrier cream. ▸ Skin cleansing cream.

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:

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Material	CPI
BUTYL	A
BUTYL/NEOPRENE	C
CPE	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/CHLOROBUTYL	C
VITON/NEOPRENE	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.

Respiratory protection

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

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	BAX-AUS P2	-	BAX-PAPR-AUS / Class 1 P2
up to 50 x ES	-	BAX-AUS / Class 1 P2	-
up to 100 x ES	-	BAX-2 P2	BAX-PAPR-2 P2 ^

^ - Full-face

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)

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

Continued...

Method 8330 - Explosives by HPLC

Appearance	<p>Contains a chemical subject to Prior Informed Consent (PIC) Regulation which administers the import and export of certain hazardous chemicals and places obligations on companies who wish to export these chemicals to non-EU countries. It aims to promote shared responsibility and cooperation in the international trade of hazardous chemicals, and to protect human health and the environment by providing developing countries with information on how to store, transport, use and dispose of hazardous chemicals safely.</p> <p>This Regulation implements, within the European Union, the Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade.</p> <p>The PIC Regulation applies to banned or severely restricted chemicals listed in Annex I, containing industrial chemicals, pesticides and biocides. The export of these chemicals is subject to two types of requirement: export notification and explicit consent.</p> <p>The PIC Regulation also applies to chemicals that are banned for export as listed in Annex V and to all chemicals when exported regarding their packaging and labelling, which must comply with relevant EU legislation.</p> <p>Clear liquid</p>		
Physical state	Liquid	Relative density (Water = 1)	Not Available
Odour	Pungent	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	<23	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	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)	>99.9
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Not Available	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"> ▶ Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content. ▶ Presence of elevated temperatures. ▶ 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. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.</p> <p>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>Minor but regular methanol exposures may affect the central nervous system, optic nerves and retinae. Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision. Continued or severe exposures may cause damage to optic nerves, which may become severe with permanent visual impairment even blindness resulting.</p> <p>WARNING: Methanol is only slowly eliminated from the body and should be regarded as a cumulative poison which cannot be made non-harmful [CCINFO]</p> <p>Changes to blood vessels and the presence of methaemoglobin in the blood contribute to the signs and symptoms characteristic of trinitrotoluene (TNT) poisoning. Exposure may cause sneezing, sore throat, headache, weakness, anaemia and liver injury.</p> <p>The smell of acetonitrile does not give enough warning of exposure. The gas is highly toxic, and inhaling it can cause loss of consciousness.</p>
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Method 8330 - Explosives by HPLC

Ingestion	<p>Severely toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual.</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>Methanol may produce a burning or painful sensation in the mouth, throat, chest, and stomach. This may be accompanied by nausea, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behaviour, visual disturbance, drowsiness, coma and death. 60-200 ml of methanol is a fatal dose for most adults with as little as 10 ml producing blindness. In massive overdose, liver, kidney, heart and muscle injury have been described.</p> <p>There is strong evidence to suggest that this material can cause, if swallowed once, very serious, irreversible damage of organs.</p> <p>Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)</p>
Skin Contact	<p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>TNT is absorbed through intact skin. Ten percent of workers exposed by skin contact become ill.</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>There is strong evidence to suggest that this material, on a single contact with skin, can cause serious, irreversible damage of organs.</p> <p>There is some evidence to suggest that 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.</p>
Eye	<p>Methanol is a mild to moderate eye irritant. High vapor concentration or liquid contact with eyes causes irritation, tearing, and burning.</p> <p>Direct contact of the eye with ethanol may cause immediate stinging and burning with reflex closure of the lid and tearing, transient injury of the corneal epithelium and hyperaemia of the conjunctiva.</p> <p>There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.</p>
Chronic	<p>Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.</p> <p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Ample evidence exists that this material directly causes reduced fertility</p> <p>Ample evidence exists that developmental disorders are directly caused by human exposure to the material.</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>Exposure at work to trinitrotoluene (TNT) and its related substances has been associated with dermatitis, bluing of the extremities, inflammation of the stomach, acute yellow shrinkage of the liver and aplastic anaemia. Occasionally, there may be increased or decreased white cell count, varying degrees of central nervous system changes (probably as a result of low oxygen levels), inflammation of the peripheral nerves, muscle pains, irregularities in the heart, muscle and menstruation, and irritation of the kidneys and urinary system. Young adult men often present with a toxic hepatitis while older workers show a full-blown aplastic anaemia. A long-term survey at a munitions plant where TNT had been handled showed no cases of permanent liver damage, although symptoms of liver involvement occurred in some workers.</p> <p>Long-term exposure to methanol vapour, at concentrations exceeding 3000 ppm, may produce cumulative effects characterised by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.</p>

Method 8330 - Explosives by HPLC	TOXICITY	IRRITATION
	Not Available	Not Available
2-amino-4,6-dinitrotoluene	Oral (Rat) LD50: 1394 mg/kg ^[2]	Not Available
4-amino-2,6-dinitrotoluene	Oral (Rat) LD50: 959 mg/kg ^[2]	Not Available
m-dinitrobenzene	dermal (rat) LD50: 1200 mg/kg ^[2] Oral (Rat) LD50: 59.5 mg/kg ^[2]	Not Available
2,4-Dinitrotoluene	dermal (guinea pig) LD50: >1000 mg/kg ^[2] Oral (Rat) LD50: 268 mg/kg ^[2]	Not Available
2,6-dinitrotoluene	Oral (Rat) LD50: 177 mg/kg ^[2]	Skin (rabbit): 500 mg/24h - mild
cyclotetramethylenetranitramine	Dermal (rabbit) LD50: 630 mg/kg ^[2] Oral (Rat) LD50: 6490 mg/kg ^[2]	Skin (rabbit) 500mg Drz. Mild
cyclotrimethylenetrinitramine	Oral (Rat) LD50: 100 mg/kg ^[2]	Not Available
nitrobenzene	Dermal (rabbit) LD50: 600 mg/kg ^[2]	Eye (rat): 500 mg/24h - mild [CCINFO]*

Method 8330 - Explosives by HPLC

	Inhalation(Rat) LC50: 556 ppm4h ^[2]	Eye: no adverse effect observed (not irritating) ^[1]
	Oral (Rat) LD50: 349 mg/kg ^[2]	Skin (rabbit): 500 mg/24h - mild
		Skin: no adverse effect observed (not irritating) ^[1]
o-nitrotoluene	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[2]	Not Available
	Oral (Rat) LD50: 891 mg/kg ^[2]	
m-nitrotoluene	TOXICITY	IRRITATION
	dermal (rat) LD50: >1157 mg/kg ^[2]	Not Available
	Inhalation(Rat) LC50: >0.604 mg/4h ^[2]	
	Oral (Mouse) LD50; 330 mg/kg ^[2]	
p-nitrotoluene	TOXICITY	IRRITATION
	dermal (rat) LD50: >16000 mg/kg ^[2]	Not Available
	Inhalation(Rat) LC50: >0.851 mg/L4h ^[1]	
	Oral (Rat) LD50: 1960 mg/kg ^[2]	
tetryl	TOXICITY	IRRITATION
	Not Available	Not Available
trinitrotoluene (TNT)	TOXICITY	IRRITATION
	Inhalation(Rat) LC50: >1.01 mg/4h ^[1]	Skin (rabbit): 500 mg/24h - mild
	Oral (Rat) LD50: 607 mg/kg ^[2]	
trinitrobenzene	TOXICITY	IRRITATION
	Oral (Rat) LD50: 275 mg/kg ^[2]	Eye (rabbit): SEVERE
methanol	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 15800 mg/kg ^[2]	Eye (rabbit): 100 mg/24h-moderate
	Inhalation(Rat) LC50: 64000 ppm4h ^[2]	Eye (rabbit): 40 mg-moderate
	Oral (Rat) LD50: 5628 mg/kg ^[2]	Eye: no adverse effect observed (not irritating) ^[1]
		Skin (rabbit): 20 mg/24 h-moderate
		Skin: no adverse effect observed (not irritating) ^[1]
acetonitrile	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2000 mg/kg ^[1]	Eye (rabbit):20 mg (open)-SEVERE
	Inhalation(Rabbit) LC50; 2828 ppm4h ^[2]	Skin (rabbit):500 mg (open)-mild
	Oral (Rabbit) LD50; 50 mg/kg ^[2]	

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

M-DINITROBENZENE	Spastic paralysis, changes in motor activity, coma, cyanosis, spermatogenesis, effects on male and female fertility recorded.
2,4-Dinitrotoluene	Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation.
2,6-DINITROTOLUENE	Oral (rat) TDLo: 13500 mg/kg/90D-I
CYCLOTETRAMETHYLENETETRAMINE	No significant acute toxicological data identified in literature search.
CYCLOTTRIMETHYLENETRINITRAMINE	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.
NITROBENZENE	The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
O-NITROTOLUENE	In making the overall evaluation, the IARC Working Group took into consideration that there is strong evidence that a mutational mechanism underlies the induction of tumours in both rodents and humans exposed to 2-nitrotoluene. WARNING: This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.
TETRYL	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.

Method 8330 - Explosives by HPLC

TRINITROTOLUENE (TNT)	The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
TRINITROBENZENE	NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.
Method 8330 - Explosives by HPLC & ACETONITRILE	Absorption of acetonitrile occurs after oral, skin, or inhalation exposure. The liquid or vapour is irritating to the skin, eyes, and airways. At high enough doses, death can occur quickly from respiratory failure. Lower doses cause typical symptoms of cyanide poisoning such as salivation, nausea, vomiting, anxiety, confusion, rapid and difficult breathing, rapid pulse, unconsciousness, and convulsions.
M-DINITROBENZENE & TETRYL	Bacterial cell mutagen
2,4-Dinitrotoluene & 2,6-DINITROTOLUENE	For dinitrotoluene (dinitromethylbenzene; DNT): In humans, heavy DNT exposure causes signs of methaemoglobin in the blood, which are reversible 2-3 days after removal from exposure. Signs of disturbances in liver function and exposure-dependent toxic effects on the kidney tubules were additionally found in exposed workers. In humans, DNT is absorbed after inhalation and skin contact, and is rapidly metabolized and excreted in urine. Acute toxicity: Animal testing indicates that DNT has relatively low acute toxicity by skin contact and moderately toxic by swallowing. DNT is not considered to irritate the human eye.
2,6-DINITROTOLUENE & CYCLOTETRAMETHYLENETETRANITRAMINE & NITROBENZENE & TRINITROTOLUENE (TNT) & METHANOL & ACETONITRILE	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.
2,6-DINITROTOLUENE & NITROBENZENE	WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
O-NITROTOLUENE & M-NITROTOLUENE	Fatty liver degeneration, methaemoglobinaemia recorded.
TETRYL & TRINITROBENZENE & ACETONITRILE	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Acute Toxicity	✓
Skin Irritation/Corrosion	✓
Serious Eye Damage/Irritation	✓
Respiratory or Skin sensitisation	✗
Mutagenicity	✗
Carcinogenicity	✗
Reproductivity	✓
STOT - Single Exposure	✓
STOT - Repeated Exposure	✓
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

Method 8330 - Explosives by HPLC	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available
2-amino-4,6-dinitrotoluene	EC50	48h	Crustacea	4.5mg/l	4
	EC50	96h	Algae or other aquatic plants	1.912-3.45mg/L	4
	LC50	96h	Fish	5-15mg/l	4
	EC50(ECx)	96h	Algae or other aquatic plants	1.912-3.45mg/L	4
4-amino-2,6-dinitrotoluene	EC50	48h	Crustacea	5.2mg/l	4
	EC50	96h	Algae or other aquatic plants	10.272-13.347mg/L	4
	LC50	96h	Fish	5-15mg/l	4
	EC50(ECx)	48h	Crustacea	5.2mg/l	4
m-dinitrobenzene	EC50	72h	Algae or other aquatic plants	0.22mg/L	5
	EC50	96h	Algae or other aquatic plants	0.24mg/l	1
	EC50	48h	Crustacea	24-31.4mg/l	4
	EC03(ECx)	2h	Algae or other aquatic plants	0.07mg/l	4
	LC50	96h	Fish	1.2-2.3mg/l	4
2,4-Dinitrotoluene	EC50	48h	Crustacea	22mg/l	4
	EC50	96h	Algae or other aquatic plants	0.07-0.1mg/l	4
	LC50	96h	Fish	6.3mg/l	4
	NOEC(ECx)	504h	Crustacea	0.02mg/L	5

Continued...

Method 8330 - Explosives by HPLC

	Endpoint	Test Duration (hr)	Species	Value	Source
2,6-dinitrotoluene	EC50	72h	Algae or other aquatic plants	11mg/l	4
	EC50	48h	Crustacea	21.7mg/l	4
	EC50	96h	Algae or other aquatic plants	12mg/l	4
	LC50	96h	Fish	17.2-20.2mg/l	4
	NOEC(ECx)	504h	Crustacea	0.06mg/L	5
cyclotetramethylenetetranitramine	EC50	72h	Algae or other aquatic plants	>2.61mg/l	2
	EC50	48h	Crustacea	>32mg/l	4
	EC50	96h	Algae or other aquatic plants	>6.516mg/L	4
	LC50	96h	Fish	8.8-26mg/l	4
	NOEC(ECx)	72h	Algae or other aquatic plants	2.61mg/l	2
cyclotrimethylenetrinitramine	EC50	72h	Algae or other aquatic plants	>32.36mg/l	2
	EC50	48h	Crustacea	>17mg/l	2
	EC50	96h	Algae or other aquatic plants	>36.69mg/l	4
	LC50	96h	Fish	0.01706-0.03889mg/l	4
	NOEC(ECx)	96h	Fish	0.00975mg/l	4
nitrobenzene	BCF	1008h	Fish	1.6-7.7	7
	EC50	72h	Algae or other aquatic plants	8.772-17.04mg/L	4
	EC50	96h	Algae or other aquatic plants	3.45-38.13mg/l	4
	EC50	48h	Crustacea	25.6-42mg/l	4
	NOEC(ECx)	Not Available	Fish	<0.001mg/l	1
	LC50	96h	Fish	24.253mg/L	4
o-nitrotoluene	BCF	1008h	Fish	6.6-29.7	7
	EC50	72h	Algae or other aquatic plants	16-30mg/l	4
	EC50	48h	Crustacea	5.4mg/l	1
	EC50	96h	Algae or other aquatic plants	26-86mg/l	4
	ErC50	72h	Algae or other aquatic plants	22mg/l	2
	NOEC(ECx)	504h	Crustacea	0.5mg/l	1
	LC50	96h	Fish	19-50mg/l	4
m-nitrotoluene	BCF	1008h	Fish	0.47-8.5	7
	EC50	96h	Algae or other aquatic plants	14mg/l	1
	EC50	48h	Crustacea	7.4mg/l	1
	NOEC(ECx)	504h	Crustacea	0.5mg/l	2
	LC50	96h	Fish	19-50mg/l	4
p-nitrotoluene	BCF	1008h	Fish	3.7-7.2	7
	EC50	96h	Algae or other aquatic plants	15-31mg/l	4
	EC50	48h	Crustacea	~4.2mg/l	2
	NOEC(ECx)	Not Available	Crustacea	0.2mg/l	2
	LC50	96h	Fish	19-50mg/l	4
tetryl	NOEC(ECx)	96h	Crustacea	0.54mg/l	4
trinitrotoluene (TNT)	EC50	72h	Algae or other aquatic plants	0.19mg/l	2
	EC50	48h	Crustacea	9.49mg/l	2
	EC50	96h	Algae or other aquatic plants	0.477-0.659mg/L	4
	LC50	96h	Fish	0.7-1mg/l	4
	NOEC(ECx)	6480h	Fish	0.005mg/l	4

Continued...

Method 8330 - Explosives by HPLC

	Endpoint	Test Duration (hr)	Species	Value	Source
trinitrobenzene	EC50	48h	Crustacea	2.63-3.38mg/l	4
	NOEC(ECx)	768h	Fish	0.08mg/l	4
	LC50	96h	Fish	0.34-0.43mg/l	4
methanol	EC50	48h	Crustacea	>10000mg/l	2
	EC50	96h	Algae or other aquatic plants	14.11-20.623mg/l	4
	LC50	96h	Fish	290mg/l	2
	NOEC(ECx)	720h	Fish	0.007mg/L	4
acetonitrile	EC50	72h	Algae or other aquatic plants	>1000mg/l	2
	EC50	48h	Crustacea	>1000mg/l	2
	LC50	96h	Fish	>100mg/l	2
	NOEC(ECx)	24h	Crustacea	0.00001mg/l	4

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.

The compounds 2-amino-4,6-dinitrotoluene (2A-DNT) and 4-amino-2,6-dinitrotoluene (4A-DNT), reduction products of 2,4,5-trinitrotoluene (TNT), are rapidly formed by microbial degradation when TNT is released to the soil.

Environmental Fate: 2A-DNT is photosensitive at wavelengths >290nm indicating that it may have the potential to undergo photolytic degradation. Study shows that 2A-DNT was degraded in the presence of mixed microbial isolates, undifferentiated sludge samples, and in the presence of pure culture of *Pseudomonas* spp. It is suggested that 4A-DNT may also undergo a similar range of interactions.

For Methanol: Log Kow: -0.82 to -0.66; Koc: 1; Henry's Law Constant: 4.55x10⁻⁶ atm-cu m/mole; Vapor Pressure: 127 mm Hg; BCF: < 10.

Atmospheric Fate: Methanol is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase methanol is broken down in the atmosphere by reactions with hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days.

Terrestrial Fate: Methanol is expected to have very high mobility in soil.

Soil Guidelines: Dutch Criteria:

free cyanide: 1 mg/kg (target)

20 mg/kg (intervention)

complex cyanide (pH 5): 5 mg/kg (target)

50 mg/kg (intervention)

Air Quality Standards: no safe guidelines recommended due to carcinogenic properties.

Abiotic Effects: Acetonitrile is a volatile organic compound (VOC) substance, thus it is a contributor to the formation of photochemical smog in the presence of other VOCs.

Transport: Acetonitrile is primarily removed by volatilization and leaching into groundwater. It has low adsorption potential to soils. Air - Acetonitrile may persist in the troposphere and can be transported over long distances.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
2-amino-4,6-dinitrotoluene	HIGH	HIGH
4-amino-2,6-dinitrotoluene	HIGH	HIGH
m-dinitrobenzene	HIGH (Half-life = 360 days)	HIGH (Half-life = 875 days)
2,4-Dinitrotoluene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 118.33 days)
2,6-dinitrotoluene	HIGH (Half-life = 360 days)	MEDIUM (Half-life = 118.33 days)
cyclotetramethylenetetranitramine	HIGH	HIGH
cyclotrimethylenetrinitramine	HIGH	HIGH
nitrobenzene	HIGH (Half-life = 394 days)	LOW (Half-life = 0.23 days)
o-nitrotoluene	HIGH	HIGH
m-nitrotoluene	HIGH	HIGH
p-nitrotoluene	HIGH	HIGH
tetryl	HIGH	HIGH
trinitrotoluene (TNT)	HIGH	HIGH
trinitrobenzene	HIGH	HIGH
methanol	LOW	LOW
acetonitrile	HIGH (Half-life = 360 days)	HIGH (Half-life = 541.29 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
2-amino-4,6-dinitrotoluene	LOW (LogKOW = 1.2587)
4-amino-2,6-dinitrotoluene	LOW (LogKOW = 1.8364)
m-dinitrobenzene	LOW (BCF = 7.5)
2,4-Dinitrotoluene	HIGH (BCF = 2507)
2,6-dinitrotoluene	LOW (LogKOW = 2.1757)

Continued...

Method 8330 - Explosives by HPLC

Ingredient	Bioaccumulation
cyclotetramethylenetetranitramine	LOW (LogKOW = 0.8242)
cyclotrimethylenetrinitramine	LOW (LogKOW = 0.87)
nitrobenzene	LOW (BCF = 7.7)
o-nitrotoluene	LOW (BCF = 29.9)
m-nitrotoluene	LOW (BCF = 12)
p-nitrotoluene	LOW (BCF = 7.2)
tetryl	LOW (LogKOW = 1.6441)
trinitrotoluene (TNT)	LOW (LogKOW = 1.6)
trinitrobenzene	LOW (LogKOW = 1.18)
methanol	LOW (BCF = 10)
acetonitrile	LOW (BCF = 0.4)

Mobility in soil

Ingredient	Mobility
2-amino-4,6-dinitrotoluene	LOW (KOC = 100.5)
4-amino-2,6-dinitrotoluene	LOW (KOC = 100.5)
m-dinitrobenzene	LOW (KOC = 220.1)
2,4-Dinitrotoluene	LOW (KOC = 363.8)
2,6-dinitrotoluene	LOW (KOC = 371.4)
cyclotetramethylenetetranitramine	LOW (KOC = 1853)
cyclotrimethylenetrinitramine	LOW (KOC = 195.4)
nitrobenzene	LOW (KOC = 190.8)
o-nitrotoluene	LOW (KOC = 315.5)
m-nitrotoluene	LOW (KOC = 309)
p-nitrotoluene	LOW (KOC = 309)
tetryl	LOW (KOC = 2141)
trinitrotoluene (TNT)	LOW (KOC = 1834)
trinitrobenzene	LOW (KOC = 1087)
methanol	HIGH (KOC = 1)
acetonitrile	LOW (KOC = 4.5)


SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ 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 SDS and observe all notices pertaining to the product. ▶ 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.
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SECTION 14 Transport information

Labels Required

	
Marine Pollutant	NO
HAZCHEM	*3YE

Land transport (ADG)

UN number or ID number	1993
UN proper shipping name	FLAMMABLE LIQUID, N.O.S. (contains acetonitrile and methanol)

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Transport hazard class(es)	Class	3
	Subsidiary risk	Not Applicable
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	274
	Limited quantity	1 L

Air transport (ICAO-IATA / DGR)

UN number	1993	
UN proper shipping name	Flammable liquid, n.o.s. * (contains acetonitrile and methanol)	
Transport hazard class(es)	ICAO/IATA Class	3
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	3H
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A3
	Cargo Only Packing Instructions	364
	Cargo Only Maximum Qty / Pack	60 L
	Passenger and Cargo Packing Instructions	353
	Passenger and Cargo Maximum Qty / Pack	5 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y341
	Passenger and Cargo Limited Maximum Qty / Pack	1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1993	
UN proper shipping name	FLAMMABLE LIQUID, N.O.S. (contains acetonitrile and methanol)	
Transport hazard class(es)	IMDG Class	3
	IMDG Subrisk	Not Applicable
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-E, S-E
	Special provisions	274
	Limited Quantities	1 L

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

Not Applicable

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

Product name	Group
2-amino-4,6-dinitrotoluene	Not Available
4-amino-2,6-dinitrotoluene	Not Available
m-dinitrobenzene	Not Available
2,4-Dinitrotoluene	Not Available
2,6-dinitrotoluene	Not Available
cyclotetramethylenetetranitramine	Not Available
cyclotrimethylenetrinitramine	Not Available
nitrobenzene	Not Available
o-nitrotoluene	Not Available
m-nitrotoluene	Not Available
p-nitrotoluene	Not Available
tetryl	Not Available
trinitrotoluene (TNT)	Not Available
trinitrobenzene	Not Available
methanol	Not Available
acetonitrile	Not Available

Continued...

Method 8330 - Explosives by HPLC

Transport in bulk in accordance with the IGC Code

Product name	Ship Type
2-amino-4,6-dinitrotoluene	Not Available
4-amino-2,6-dinitrotoluene	Not Available
m-dinitrobenzene	Not Available
2,4-Dinitrotoluene	Not Available
2,6-dinitrotoluene	Not Available
cyclotetramethylenetetranitramine	Not Available
cyclotrimethylenetrinitramine	Not Available
nitrobenzene	Not Available
o-nitrotoluene	Not Available
m-nitrotoluene	Not Available
p-nitrotoluene	Not Available
tetryl	Not Available
trinitrotoluene (TNT)	Not Available
trinitrobenzene	Not Available
methanol	Not Available
acetonitrile	Not Available

SECTION 15 Regulatory information

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

2-amino-4,6-dinitrotoluene is found on the following regulatory lists

Not Applicable

4-amino-2,6-dinitrotoluene is found on the following regulatory lists

Not Applicable

m-dinitrobenzene is found on the following regulatory listsAustralia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)**2,4-Dinitrotoluene is found on the following regulatory lists**Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern ListInternational 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**2,6-dinitrotoluene is found on the following regulatory lists**Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern ListInternational 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
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)**cyclotetramethylenetetranitramine is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

cyclotrimethylenetrinitramine is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

nitrobenzene is found on the following regulatory listsAustralia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)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**o-nitrotoluene is found on the following regulatory lists**Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern ListInternational 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 2A: Probably carcinogenic to humans
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic**m-nitrotoluene is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

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p-nitrotoluene is found on the following regulatory lists

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

tetryl is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

trinitrotoluene (TNT) is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
 Australian Inventory of Industrial Chemicals (AIIC)
 Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

trinitrobenzene is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

methanol is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
 Australian Inventory of Industrial Chemicals (AIIC)
 Chemical Footprint Project - Chemicals of High Concern List

acetonitrile is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; trinitrobenzene)
Canada - DSL	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; tetryl; trinitrobenzene)
Canada - NDSL	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; m-dinitrobenzene; 2,4-Dinitrotoluene; 2,6-dinitrotoluene; cyclotetramethylenetetranitramine; cyclotrimethylenetrinitramine; nitrobenzene; o-nitrotoluene; m-nitrotoluene; p-nitrotoluene; trinitrotoluene (TNT); trinitrobenzene; methanol; acetonitrile)
China - IECSC	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene)
Europe - EINEC / ELINCS / NLP	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene)
Japan - ENCS	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene)
Korea - KECI	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; cyclotetramethylenetetranitramine; trinitrobenzene)
New Zealand - NZIoC	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; 2,6-dinitrotoluene; trinitrobenzene)
Philippines - PICCS	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; 2,6-dinitrotoluene; cyclotetramethylenetetranitramine; cyclotrimethylenetrinitramine; tetryl)
USA - TSCA	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene)
Taiwan - TCSI	No (2-amino-4,6-dinitrotoluene)
Mexico - INSQ	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; m-dinitrobenzene; m-nitrotoluene; p-nitrotoluene)
Vietnam - NCI	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; cyclotetramethylenetetranitramine; tetryl; trinitrobenzene)
Russia - FBEPH	No (2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; cyclotrimethylenetrinitramine; tetryl; trinitrobenzene)
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	18/07/2023
Initial Date	18/07/2023

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

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OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index
AIIIC: 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
KECI: 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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