



## ICP multi-element standard solution XXI for MS

### 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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S.GHS.AUS.EN

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

##### Product Identifier

Product name	ICP multi-element standard solution XXI for MS
Synonyms	Not Available
Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Nitric acid solution)
Other means of identification	MES-21-1

##### 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	<a href="http://www.novachem.com.au">www.novachem.com.au</a>	<a href="http://www.novachem.com.au">www.novachem.com.au</a>
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]	Skin Corrosion/Irritation Category 1B, Corrosive to Metals Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) 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)

H314	Causes severe skin burns and eye damage.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H330	Fatal if inhaled.

##### Precautionary statement(s) Prevention

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<b>P260</b>	Do not breathe mist/vapours/spray.
<b>P264</b>	Wash all exposed external body areas thoroughly after handling.
<b>P271</b>	Use only outdoors or in a well-ventilated area.
<b>P280</b>	Wear protective gloves, protective clothing, eye protection and face protection.

## Precautionary statement(s) Response

<b>P301+P330+P331</b>	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
<b>P303+P361+P353</b>	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
<b>P304+P340</b>	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
<b>P305+P351+P338</b>	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

## Precautionary statement(s) Storage

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

## Precautionary statement(s) Disposal

<b>P501</b>	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
7761-88-8	0.002	<u>silver nitrate</u>
7784-27-2	0.014	<u>aluminium nitrate</u>
7440-38-2	0.001	<u>arsenic</u>
10022-31-8	0.002	<u>barium nitrate</u>
19049-40-2	0.011	<u>beryllium acetate, basic</u>
7440-69-9	0.001	<u>bismuth</u>
471-34-1	0.002	<u>calcium carbonate</u>
7440-43-9	0.001	<u>cadmium</u>
7440-48-4	0.001	<u>cobalt</u>
Not Available	0.008	7789-02-8
7789-18-6	0.002	<u>caesium nitrate</u>
7440-50-8	0.001	<u>copper</u>
7782-61-8	0.007	<u>ferric nitrate</u>
7440-55-3	0.001	<u>gallium</u>
7440-74-6	0.001	<u>indium</u>
7757-79-1	0.003	<u>potassium nitrate</u>
554-13-2	0.005	<u>lithium carbonate</u>
13446-18-9	0.01	<u>magnesium nitrate</u>
6156-78-1	0.004	<u>manganese(II) acetate tetrahydrate</u>
7631-99-4	0.004	<u>sodium nitrate</u>
7440-02-0	0.001	<u>nickel</u>
10099-74-8	0.002	<u>lead nitrate</u>
13126-12-0	0.002	<u>rubidium nitrate</u>
7446-08-4	0.001	<u>selenium dioxide</u>
10042-76-9	0.002	<u>strontium nitrate</u>
7440-28-0	0.001	<u>thallium</u>
1314-62-1	0.002	<u>vanadium pentoxide</u>
6159-44-0	0.002	<u>uranyl acetate</u>
7440-66-6	0.001	<u>zinc</u>
7697-37-2	5	<u>nitric acid</u>
7732-18-5	94.905	<u>water</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

Continued...

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<p><b>Eye Contact</b></p>	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Immediately hold eyelids apart and flush the eye continuously with running water.</li> <li>▶ 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.</li> <li>▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.</li> <li>▶ Transport to hospital or doctor without delay.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<p><b>Skin Contact</b></p>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately flush body and clothes with large amounts of water, using safety shower if available.</li> <li>▶ Quickly remove all contaminated clothing, including footwear.</li> <li>▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.</li> <li>▶ Transport to hospital, or doctor.</li> </ul> <p>For thermal burns:</p> <ul style="list-style-type: none"> <li>▶ Decontaminate area around burn.</li> <li>▶ Consider the use of cold packs and topical antibiotics.</li> </ul> <p>For first-degree burns (affecting top layer of skin)</p> <ul style="list-style-type: none"> <li>▶ Hold burned skin under cool (not cold) running water or immerse in cool water until pain subsides.</li> <li>▶ Use compresses if running water is not available.</li> <li>▶ Cover with sterile non-adhesive bandage or clean cloth.</li> <li>▶ Do NOT apply butter or ointments; this may cause infection.</li> <li>▶ Give over-the counter pain relievers if pain increases or swelling, redness, fever occur.</li> </ul> <p>For second-degree burns (affecting top two layers of skin)</p> <ul style="list-style-type: none"> <li>▶ Cool the burn by immerse in cold running water for 10-15 minutes.</li> <li>▶ Use compresses if running water is not available.</li> <li>▶ Do NOT apply ice as this may lower body temperature and cause further damage.</li> <li>▶ Do NOT break blisters or apply butter or ointments; this may cause infection.</li> <li>▶ Protect burn by cover loosely with sterile, nonstick bandage and secure in place with gauze or tape.</li> </ul> <p>To prevent shock: (unless the person has a head, neck, or leg injury, or it would cause discomfort):</p> <ul style="list-style-type: none"> <li>▶ Lay the person flat.</li> <li>▶ Elevate feet about 12 inches.</li> <li>▶ Elevate burn area above heart level, if possible.</li> <li>▶ Cover the person with coat or blanket.</li> <li>▶ Seek medical assistance.</li> </ul> <p>For third-degree burns Seek immediate medical or emergency assistance.</p> <p>In the mean time:</p> <ul style="list-style-type: none"> <li>▶ Protect burn area cover loosely with sterile, nonstick bandage or, for large areas, a sheet or other material that will not leave lint in wound.</li> <li>▶ Separate burned toes and fingers with dry, sterile dressings.</li> <li>▶ Do not soak burn in water or apply ointments or butter; this may cause infection.</li> <li>▶ To prevent shock see above.</li> <li>▶ For an airway burn, do not place pillow under the person's head when the person is lying down. This can close the airway.</li> <li>▶ Have a person with a facial burn sit up.</li> <li>▶ Check pulse and breathing to monitor for shock until emergency help arrives.</li> </ul>
<p><b>Inhalation</b></p>	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ 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.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> </ul>
<p><b>Ingestion</b></p>	<ul style="list-style-type: none"> <li>▶ For advice, contact a Poisons Information Centre or a doctor at once.</li> <li>▶ Urgent hospital treatment is likely to be needed.</li> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Transport to hospital or doctor without delay.</li> </ul>

### Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Although gamma radiation is present in all uranium mines, levels rarely exceed the acceptable standard of 5 rads per year. Adverse effects of uranium mining result from the inhalation of radon daughters. (The decay of radium produces radon, which in turn forms short life radon daughters i.e. isotopes of lead bismuth and polonium.) These products attach to dust particles which are inhaled by workers.

Alpha radiation delivers 95% of the radiation dose to the tracheobronchial epithelium. Lung cancer mortality and chronic lung disease [in uranium miners] strongly depends on radon exposure, cigarette smoking, and height. Although squamous and oat cell tumour types display a dose response effect, there is some difference in the strength of the association. [Ellenhorn & Barceloux]

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.

Continued...

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- ▶ 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]

For radiation poisoning:

- ▶ Lavage may be useful. Care should be taken to avoid aspiration.
- ▶ The vomitus and lavage fluids should be saved for examination and monitoring. The gastric fluids and fluids used for lavage must be stored in metal containers for later disposal.
- ▶ There is no antidote for radiation sickness
- ▶ Treatment should be symptomatic and supportive, regardless of the dose received. IAEA Safety Series No.: 47; Manual on Early Medical Treatment of Possible Radiation Injury, 1978, p.35.

#### BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Anticipate seizures.
- ▶ Routine emergency care may be necessary for associated injuries.
- ▶ **Do not use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ If necessary, perform BLS care.

#### ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Support vital signs with IV lactated Ringer's solution.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Treat seizures with diazepam.
- ▶ Advanced life-support care may be needed.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.
- ▶ Chelating agents may be useful if given before or immediately after exposure.

#### SPECIAL CONSIDERATIONS

- ▶ Symptoms associated with radioactives exposure are generally delayed. Treatment should address other medical problems or trauma.
- ▶ An accurate history of exposure is essential to determine proper treatment; Exposure to 100 rads is expected to produce GI symptoms such as nausea, vomiting, abdominal cramps, diarrhoea; onset of symptoms may be delayed for several hours. Exposure to 600 rads is expected to result in severe GI symptoms such as necrotic gastroenteritis which may result in dehydration and may be fatal within days. Exposure to several thousand rads is expected to produce neurological/ cardiovascular symptoms including confusion, lethargy, ataxia, seizures, coma, and cardiovascular collapse, within minutes or hours. Severe exposures may also produce bone marrow depression, leukopenia and infection.

BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

## SECTION 5 Firefighting measures

### Extinguishing media

- ▶ There is no restriction on the type of extinguisher which may be used.
- ▶ Use extinguishing media suitable for surrounding area.

### Special hazards arising from the substrate or mixture

<b>Fire Incompatibility</b>	None known.
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### Advice for firefighters

<b>Fire Fighting</b>	<ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear breathing apparatus plus protective gloves in the event of a fire.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▶ Use fire fighting procedures suitable for surrounding area.</li> </ul>
<b>Fire/Explosion Hazard</b>	<p>Under certain conditions the material may become combustible because of the ease of ignition which occurs after the material reaches a high specific area ratio (thin sections, fine particles, or molten states). However, the same material in massive solid form is comparatively difficult to ignite. Nearly all metals will burn in air under certain conditions. Some are oxidised rapidly in the presence of air or moisture, generating sufficient heat to reach their ignition temperatures.</p> <ul style="list-style-type: none"> <li>▶ Non combustible.</li> <li>▶ Not considered to be a significant fire risk.</li> <li>▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> </ul> <p>Decomposition may produce toxic fumes of: metal oxides</p> <p>When aluminium oxide dust is dispersed in air, firefighters should wear protection against inhalation of dust particles, which can also contain hazardous substances from the fire absorbed on the alumina particles. May emit poisonous fumes.</p>
<b>HAZCHEM</b>	2X

## SECTION 6 Accidental release measures

### Personal precautions, protective equipment and emergency procedures

See section 8

### Environmental precautions

Continued...

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See section 12

## Methods and material for containment and cleaning up

<b>Minor Spills</b>	<ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid breathing vapours and contact with skin and eyes.</li> <li>▶ Control personal contact with the substance, by using protective equipment.</li> <li>▶ Contain and absorb spill with sand, earth, inert material or vermiculite.</li> </ul>
<b>Major Spills</b>	<ul style="list-style-type: none"> <li>▶ Clear area of personnel and move upwind.</li> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear breathing apparatus plus protective gloves.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> </ul>

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

## SECTION 7 Handling and storage

## Precautions for safe handling

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> </ul>
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ Store in a cool, dry, well-ventilated area.</li> <li>▶ Store away from incompatible materials and foodstuff containers.</li> </ul>

## Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ <b>DO NOT use aluminium or galvanised containers</b></li> <li>▶ Lined metal can, lined metal pail/ can.</li> <li>▶ Plastic pail.</li> <li>▶ Polyliner drum.</li> <li>▶ Packing as recommended by manufacturer.</li> </ul> <p>For low viscosity materials</p> <ul style="list-style-type: none"> <li>▶ Drums and jerricans must be of the non-removable head type.</li> <li>▶ Where a can is to be used as an inner package, the can must have a screwed enclosure.</li> </ul> <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"> <li>▶ Removable head packaging;</li> <li>▶ Cans with friction closures and</li> <li>▶ low pressure tubes and cartridges</li> </ul> <p>may be used.</p> <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>
<b>Storage incompatibility</b>	<p>Derivative of electronegative and electropositive metals. Inorganic alkaline metal derivative For aluminas (aluminium oxide): Incompatible with hot chlorinated rubber. In the presence of chlorine trifluoride may react violently and ignite. -May initiate explosive polymerisation of olefin oxides including ethylene oxide. -Produces exothermic reaction above 200°C with halocarbons and an exothermic reaction at ambient temperatures with halocarbons in the presence of other metals. The substance may be or contains a "metalloid" The following elements are considered to be metalloids; boron, silicon, germanium, arsenic, antimony, tellurium and (possibly) polonium The electronegativities and ionisation energies of the metalloids are between those of the metals and nonmetals, so the metalloids exhibit characteristics of both classes. The reactivity of the metalloids depends on the element with which they are reacting. For example, boron acts as a nonmetal when reacting with sodium yet as a metal when reacting with fluorine. Unlike most metals, most metalloids are amphoteric- that is they can act as both an acid and a base. Actinide (actinoid) Only thorium and uranium occur in usable quantities in nature. The other actinides are man-made elements. All actinides are radioactive. They share similar chemistry with the lanthanides (lanthanoids) The size of actinides decreases with increasing atomic number.</p> <ul style="list-style-type: none"> <li>▶ <b>WARNING:</b> Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.</li> <li>▶ The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono- or poly-fluorobenzene show extreme sensitivity to heat and are explosive.</li> <li>▶ Avoid strong bases.</li> </ul>

## 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	silver nitrate	Silver, soluble compounds (as Ag)	0.01 mg/m3	Not Available	Not Available	Not Available

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Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	aluminium nitrate	Aluminium, soluble salts (as Al)	2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	arsenic	Arsenic & soluble compounds (as As)	0.05 mg/m3	Not Available	Not Available	(g) Some compounds in these groups are classified as carcinogenic or as sensitisers. Check individual classification details on the safety data sheet for information on classification.
Australia Exposure Standards	barium nitrate	Barium, soluble compounds (as Ba)	0.5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	beryllium acetate, basic	Beryllium & compounds	0.002 mg/m3	Not Available	Not Available	(g) Some compounds in these groups are classified as carcinogenic or as sensitisers. Check individual classification details on the safety data sheet for information on classification.
Australia Exposure Standards	calcium carbonate	Calcium carbonate	10 mg/m3	Not Available	Not Available	(a) This value is for inhalable dust containing no asbestos and < 1% crystalline silica.
Australia Exposure Standards	cadmium	Cadmium and compounds (as Cd)	0.01 mg/m3	Not Available	Not Available	(g) Some compounds in these groups are classified as carcinogenic or as sensitisers. Check individual classification details on the safety data sheet for information on classification.
Australia Exposure Standards	cobalt	Cobalt, metal dust & fume (as Co)	0.05 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	copper	Copper, dusts & mists (as Cu)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	copper	Copper (fume)	0.2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	ferric nitrate	Iron salts, soluble (as Fe)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	indium	Indium & compounds (as In)	0.1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	manganese(II) acetate tetrahydrate	Manganese, dust & compounds (as Mn)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nickel	Nickel, metal	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	nickel	Nickel, powder	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	lead nitrate	Lead, inorganic dusts & fumes (as Pb)	0.05 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	selenium dioxide	Selenium compounds (as Se) excluding hydrogen selenide	0.1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	vanadium pentoxide	Vanadium (as V2O5), (respirable dust & fume)	0.05 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	uranyl acetate	Uranium (natural), soluble & insoluble compounds (as H)	0.2 mg/m3	0.6 mg/m3	Not Available	Not Available
Australia Exposure Standards	nitric acid	Nitric acid	2 ppm / 5.2 mg/m3	10 mg/m3 / 4 ppm	Not Available	Not Available

## Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
silver nitrate	0.047 mg/m3	0.9 mg/m3	5.4 mg/m3
aluminium nitrate	47 mg/m3	68 mg/m3	410 mg/m3
aluminium nitrate	83 mg/m3	920 mg/m3	5,500 mg/m3
arsenic	1.5 mg/m3	17 mg/m3	100 mg/m3
barium nitrate	2.9 mg/m3	350 mg/m3	2,100 mg/m3
bismuth	15 mg/m3	170 mg/m3	990 mg/m3
calcium carbonate	45 mg/m3	210 mg/m3	1,300 mg/m3
cadmium	Not Available	Not Available	Not Available
cobalt	0.18 mg/m3	2 mg/m3	20 mg/m3
caesium nitrate	7.2 mg/m3	79 mg/m3	470 mg/m3
copper	3 mg/m3	33 mg/m3	200 mg/m3
ferric nitrate	13 mg/m3	140 mg/m3	850 mg/m3
ferric nitrate	22 mg/m3	110 mg/m3	640 mg/m3
gallium	30 mg/m3	330 mg/m3	2,000 mg/m3
indium	0.3 mg/m3	3.3 mg/m3	20 mg/m3
potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
lithium carbonate	3.1 mg/m3	34 mg/m3	210 mg/m3

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Ingredient	TEEL-1	TEEL-2	TEEL-3
magnesium nitrate	30 mg/m3	330 mg/m3	2,000 mg/m3
magnesium nitrate	16 mg/m3	180 mg/m3	1,100 mg/m3
manganese(II) acetate tetrahydrate	13 mg/m3	22 mg/m3	740 mg/m3
manganese(II) acetate tetrahydrate	9.4 mg/m3	16 mg/m3	96 mg/m3
sodium nitrate	4.1 mg/m3	45 mg/m3	270 mg/m3
nickel	4.5 mg/m3	50 mg/m3	99 mg/m3
lead nitrate	0.24 mg/m3	180 mg/m3	1,100 mg/m3
rubidium nitrate	14 mg/m3	150 mg/m3	920 mg/m3
selenium dioxide	0.84 mg/m3	1.6 mg/m3	9.5 mg/m3
strontium nitrate	5.7 mg/m3	62 mg/m3	370 mg/m3
thallium	0.06 mg/m3	3.3 mg/m3	20 mg/m3
vanadium pentoxide	0.64 mg/m3	7 mg/m3	70 mg/m3
uranyl acetate	0.98 mg/m3	5.5 mg/m3	33 mg/m3
zinc	6 mg/m3	21 mg/m3	120 mg/m3
nitric acid	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
silver nitrate	10 mg/m3	Not Available
aluminium nitrate	Not Available	Not Available
arsenic	5 mg/m3	Not Available
barium nitrate	50 mg/m3	Not Available
beryllium acetate, basic	4 mg/m3	Not Available
bismuth	Not Available	Not Available
calcium carbonate	Not Available	Not Available
cadmium	9 mg/m3	Not Available
cobalt	20 mg/m3	Not Available
caesium nitrate	Not Available	Not Available
copper	100 mg/m3	Not Available
ferric nitrate	Not Available	Not Available
gallium	Not Available	Not Available
indium	Not Available	Not Available
potassium nitrate	Not Available	Not Available
lithium carbonate	Not Available	Not Available
magnesium nitrate	Not Available	Not Available
manganese(II) acetate tetrahydrate	500 mg/m3	Not Available
sodium nitrate	Not Available	Not Available
nickel	10 mg/m3	Not Available
lead nitrate	100 mg/m3	Not Available
rubidium nitrate	Not Available	Not Available
selenium dioxide	1 mg/m3	Not Available
strontium nitrate	Not Available	Not Available
thallium	Not Available	Not Available
vanadium pentoxide	35 mg/m3	Not Available
uranyl acetate	10 mg/m3	Not Available
zinc	Not Available	Not Available
nitric acid	25 ppm	Not Available
water	Not Available	Not Available

## Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
caesium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
gallium	E	≤ 0.01 mg/m <sup>3</sup>
potassium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
lithium carbonate	E	≤ 0.01 mg/m <sup>3</sup>
magnesium nitrate	E	≤ 0.01 mg/m <sup>3</sup>

## 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.

Continued...

## ICP multi-element standard solution XXI for MS

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
sodium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
rubidium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
strontium nitrate	E	≤ 0.01 mg/m <sup>3</sup>
thallium	E	≤ 0.01 mg/m <sup>3</sup>
<b>Notes:</b>	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

<b>Appropriate engineering controls</b>	<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:            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.</p>
<b>Personal protection</b>	
<b>Eye and face protection</b>	<ul style="list-style-type: none"> <li>▶ Chemical goggles.</li> <li>▶ Full face shield may be required for supplementary but never for primary protection of eyes.</li> <li>▶ 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.</li> </ul>
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Wear chemical protective gloves, e.g. PVC.</li> <li>▶ Wear safety footwear or safety gumboots, e.g. Rubber</li> <li>▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.</li> </ul>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ Eyewash unit.</li> <li>▶ Barrier cream.</li> <li>▶ Skin cleansing cream.</li> </ul>

## 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:

ICP multi-element standard solution XXI for MS

Material	CPI
BUTYL	A
NEOPRENE	A
HYPALON	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE+PVC	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
VITON	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 E-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	E-AUS P2	-	E-PAPR-AUS / Class 1 P2
up to 50 x ES	-	E-AUS / Class 1 P2	-
up to 100 x ES	-	E-2 P2	E-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(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)



## ICP multi-element standard solution XXI for MS

## Information on basic physical and chemical properties

<b>Appearance</b>	Clear liquid		
<b>Physical state</b>	Liquid	<b>Relative density (Water = 1)</b>	1.02
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	Not Available
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	Not Available
<b>pH (as supplied)</b>	<2.0	<b>Decomposition temperature (°C)</b>	Not Available
<b>Melting point / freezing point (°C)</b>	Not Available	<b>Viscosity (cSt)</b>	Not Available
<b>Initial boiling point and boiling range (°C)</b>	83	<b>Molecular weight (g/mol)</b>	Not Available
<b>Flash point (°C)</b>	Not Available	<b>Taste</b>	Not Available
<b>Evaporation rate</b>	Not Available	<b>Explosive properties</b>	Not Available
<b>Flammability</b>	Not Available	<b>Oxidising properties</b>	Not Available
<b>Upper Explosive Limit (%)</b>	Not Available	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Available
<b>Lower Explosive Limit (%)</b>	Not Available	<b>Volatile Component (%vol)</b>	Not Available
<b>Vapour pressure (kPa)</b>	2.47	<b>Gas group</b>	Not Available
<b>Solubility in water</b>	Miscible	<b>pH as a solution (1%)</b>	Not Available
<b>Vapour density (Air = 1)</b>	0.62	<b>VOC g/L</b>	Not Available

## SECTION 10 Stability and reactivity

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

## SECTION 11 Toxicological information

## Information on toxicological effects

<b>Inhaled</b>	<p>The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce severe damage to the health of the individual. Relatively small amounts absorbed through the lungs may prove fatal.</p> <p>Dusts and mists containing uranium compounds are <b>highly toxic</b> and more so if inhaled rather than ingested. A single large dose can produce radiation sickness.</p> <p>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>A whole body dose of 2-10 Gray may cause loss of appetite, tiredness, nausea and vomiting, most severe after 6-12 hours. After this subsides a gross disturbance in blood cell distribution occurs with loss of white blood cells and platelets over weeks.</p>
<b>Ingestion</b>	<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>The kidney and liver can be damaged by uranium, causing excessive acid and urea in the blood and generalised ill health.</p> <p>Uranium compounds are not highly poisonous in low concentrations but may be lethal in high concentrations.</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>
<b>Skin Contact</b>	<p>The material can produce chemical burns following direct contact with the skin.</p> <p>Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models). Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Though considered non-harmful, slight irritation may result from contact because of the abrasive nature of the aluminium oxide particles. Thus it may cause itching and skin reaction and inflammation.</p> <p>All soluble uranium compounds are lethal when applied at sufficiently high concentrations in a single dose to the skin of rabbits; insoluble salts do not cause death and cause no signs of poisoning.</p>

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	<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>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>A whole body dose of 2-10 Gray may cause loss of appetite, tiredness, nausea and vomiting, most severe after 6-12 hours. After this subsides a gross disturbance in blood cell distribution occurs with loss of white blood cells and platelets over weeks.</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>Soluble uranium compounds are very dangerous. A single dose of 1 Gray may cause inflammation of the conjunctiva and cornea.</p> <p>Irritation of the eyes may produce a heavy secretion of tears (lachrymation).</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>	
Chronic	<p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Animal testing shows long term exposure to aluminium oxides may cause lung disease and cancer, depending on the size of the particle. The smaller the size, the greater the tendencies of causing harm.</p> <p>Actinides accumulate in the bone and may produce bone cancers.</p> <p>If absorbed in the body, uranium can be a hazard due to its radioactivity (alpha and gamma radiation). Uranium accumulates in the bones and can cause cancers there.</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>Systemic rubidium causes altered behaviour and manic-depressive states, and impairs the uptake of iodine by the thyroid. It affects seen on the kidneys, manifesting as alteration of urine flow and salt excretion. Long term exposure to large doses may cause sound-induced seizures.</p>	
ICP multi-element standard solution XXI for MS	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
silver nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: 50 mg/kg <sup>[2]</sup>	Eye (rabbit): 1 mg - SEVERE Eye (rabbit): 10 mg - moderate
aluminium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: >5000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: 204 mg/kg <sup>[2]</sup>	Eye (rabbit): 100mg - SEVERE Skin (rabbit): 500mg - mild
arsenic	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2400 mg/kg <sup>[1]</sup> Oral (Mouse) LD50; 144 mg/kg <sup>[1]</sup>	Eye: adverse effect observed (irreversible damage) <sup>[1]</sup> Skin: adverse effect observed (irritating) <sup>[1]</sup>
barium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: >50<300 mg/kg <sup>[1]</sup>	Eye (rabbit):100 mg/24h - moderate Skin (rabbit): 500 mg/24h - mild
beryllium acetate, basic	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
bismuth	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 5000 mg/kg <sup>[2]</sup>	Not Available
calcium carbonate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye (rabbit): 0.75 mg/24h - SEVERE
	Inhalation(Rat) LC50: >3 mg/l4h <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin (rabbit): 500 mg/24h-moderate
		Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
cadmium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rabbit) LC50; 0.028 mg/L4h <sup>[1]</sup> Oral (Rat) LD50: 225 mg/kg <sup>[2]</sup>	Not Available
cobalt	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
	Inhalation(Rat) LC50: <=0.05 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: ~550 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>

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caesium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: >300<2000 mg/kg <sup>[1]</sup>	Not Available
copper	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rat) LC50: 0.733 mg/l4h <sup>[1]</sup> Oral (Mouse) LD50; 0.7 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
ferric nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
gallium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 500 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
indium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
potassium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >5000 mg/kg <sup>[1]</sup> Inhalation(Rat) LC50: >0.527 mg/l4h <sup>[1]</sup> Oral (Rabbit) LD50; 1901 mg/kg <sup>[2]</sup>	Not Available
lithium carbonate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rat) LC50: >0.8 mg/L4h <sup>[2]</sup> Oral (Rat) LD50: 525 mg/kg <sup>[2]</sup>	Eye (rabbit) : Moderate * Skin (rabbit) : Mild *
magnesium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 5440 mg/kg <sup>[2]</sup>	Eye (rabbit): 500 mg/24h - mild Skin (rabbit): 500 mg/24h - mild
manganese(II) acetate tetrahydrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 3730 mg/kg <sup>[2]</sup>	Not Available
sodium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >5000 mg/kg <sup>[1]</sup> Oral (Rat) LD50: 1267 mg/kg <sup>[2]</sup>	Not Available
nickel	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 5000 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
lead nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup> Inhalation(Rat) LC50: >5.05 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
rubidium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 4625 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup> Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
selenium dioxide	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50: >0.052<=0.51 mg/l4h <sup>[1]</sup> Oral (Rat) LD50: >=50<=500 mg/kg <sup>[1]</sup>	Not Available
strontium nitrate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50: >4.5 mg/l4h <sup>[1]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>

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	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
thallium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
vanadium pentoxide	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2500 mg/kg <sup>[1]</sup>	Not Available
	Inhalation(Rat) LC50: 2.21-16.19 mg/l4h <sup>[2]</sup>	
	Oral (Rat) LD50: 10 mg/kg <sup>[2]</sup>	
uranyl acetate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: 204 mg/kg <sup>[2]</sup>	Not Available
zinc	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 1130 mg/kg <sup>[2]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
nitric acid	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Rat) LC50: 0.13 mg/L4h <sup>[2]</sup>	Eye: adverse effect observed (irritating) <sup>[1]</sup>
		Skin: adverse effect observed (corrosive) <sup>[1]</sup>
water	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: >90000 mg/kg <sup>[2]</sup>	Not Available
<b>Legend:</b>	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	

<b>SILVER NITRATE</b>	Reproductive effector in rats Human lymphocyte mutagen Equivocal tumorigen by RTECS criteria
<b>ARSENIC</b>	Tumorigenic - Carcinogenic by RTECS criteria. Arsenic compounds are classified by the European Union as toxic by inhalation and ingestion and toxic to aquatic life and long lasting in the environment. IARC classify arsenic in drinking water as a confirmed human carcinogen (IARC 1).  The main inorganic forms of arsenic relevant for human exposures are pentavalent arsenic (also called arsenate, As(V), or As+5) and trivalent arsenic (also called arsenite, As(III), or As+3). These inorganic species undergoes a series of reduction and oxidative/methylation steps in human liver and other tissues to form tri- and pentavalent methylated metabolites of methylarsonite [MA(III)], methylarsonate [MA(V)], dimethylarsinite [DMA(III)], and dimethylarsinate [DMA(V)]. Some mammalian species also produce trimethylated metabolites, trimethylarsine oxide  The distinction between inorganic and organic forms is important because it is generally accepted that the organic species are excreted more quickly from the body and generally considered less toxic, with a relative rank order of As(III) > As(V) >> MA(V), DMA(V) >> arsenobetaine.
	The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
<b>BARIUM NITRATE</b>	No evidence of carcinogenic properties. No evidence of mutagenic or teratogenic effects.
<b>COBALT</b>	Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms. Some people may be genetically more prone than others, and exposure to other irritants may aggravate symptoms. Allergy causing activity is due to interactions with proteins. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.
	WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever. for copper and its compounds (typically copper chloride): <b>Acute toxicity:</b> There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw.
<b>GALLIUM</b>	Substance has been investigated as a mutagen by DNA inhibition in human lymphocytes.
<b>LITHIUM CARBONATE</b>	Lacrimation, altered sleep times, hallucinations, distorted perception, toxic psychosis, excitement, ataxia, respiratory depression, allergic dermatitis (after sytemic administration), foetotoxicity and foetolethality and specific development abnormalities recorded. Non-sensitising guinea pig ** FMC SDS Goitrogenic: Goitrogens are substances that suppress the function of the thyroid gland by interfering with iodine uptake, which can, as a result, cause an enlargement of the thyroid (a goitre). Goitrogens include: - Vitexin, a flavonoid, which inhibits thyroid peroxidase, contributing to goitre - Thiocyanate and perchlorate, which decrease iodide uptake by competitive inhibition and consequently increase release of TSH from the pituitary gland - Lithium, which inhibits thyroid hormone release - Certain foods, such as soy and millet (containing vitexins) and vegetables in the genus Brassica (which includes broccoli, Brussels sprouts, cabbage, cauliflower and horseradish). - Caffeine (found in coffee, tea, cola and chocolate), which acts on thyroid function as a suppressant. The material may trigger oculozyric crisis. The term "oculozyric" refers to the bilateral elevation of the visual gaze. Initial symptoms include restlessness, agitation, malaise, or a fixed stare. Then comes the more characteristically described extreme and sustained upward deviation of the eyes. In addition, the eyes may converge, deviate upward and laterally, or deviate downward.

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MAGNESIUM NITRATE	Magnesium nitrate hexahydrate is a methaemoglobin-forming agent which if inhaled or ingested in high enough concentrations may cause fatigue, headache, dizziness. (Source: I.L.O. Encyclopaedia) The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
SODIUM NITRATE	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.
NICKEL	Oral (rat) TDLo: 500 mg/kg/5D-I Inhalation (rat) TCLo: 0.1 mg/m <sup>3</sup> /24H/17W-C Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. of Health & Human Services 2002]
RUBIDIUM NITRATE	Spastic paralysis, somnolence and convulsions recorded.
SELENIUM DIOXIDE	IARC Group 3 [MDL OHS] Bacterial cell mutagen Reproductive effector in rats.
THALLIUM	Structural changes in nerves and sheath, changes in extraocular muscles, hair loss recorded
VANADIUM PENTOXIDE	Coma, post-implantation mortality, foetolethality, specific developmental abnormalities and effects on the embryo reported. Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).
URANYL ACETATE	exposure (to) natural: uranium NAT-U US NRCP Permissible quarterly intakes of radionuclides for occupational Insolubles- 3.2 microcuries per quarter oral intake; critical organ being the GI tract Lower large intestine. 4.0 x 10 <sup>-2</sup> per quarter inhalation; critical organ being the lungs. Solubles- 1.2 microcuries per quarter oral intake; critical organ being the kidneys. 4.5 x 10 <sup>-2</sup> per quarter inhalation; critical organ being the kidneys.
NITRIC ACID	Oral (?) LD50: 50-500 mg/kg * [Various Manufacturers] The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function. The material may cause severe 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. Repeated exposures may produce severe ulceration.
ICP multi-element standard solution XXI for MS & SILVER NITRATE & BERYLLIUM ACETATE, BASIC & CALCIUM CARBONATE & CAESIUM NITRATE & FERRIC NITRATE & GALLIUM & LITHIUM CARBONATE & MANGANESE(II) ACETATE TETRAHYDRATE & SODIUM NITRATE & LEAD NITRATE & RUBIDIUM NITRATE & STRONTIUM NITRATE & VANADIUM PENTOXIDE & NITRIC ACID	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.
ICP multi-element standard solution XXI for MS & NITRIC ACID	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).
SILVER NITRATE & ALUMINIUM NITRATE & CALCIUM CARBONATE & NITRIC ACID	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
ALUMINIUM NITRATE & BARIUM NITRATE & CALCIUM CARBONATE & MAGNESIUM NITRATE & ZINC	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.
ARSENIC & BERYLLIUM ACETATE, BASIC	<b>WARNING:</b> This substance has been classified by the IARC as Group 1: <b>CARCINOGENIC TO HUMANS.</b>
BERYLLIUM ACETATE, BASIC & COBALT & COPPER & NICKEL	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.
BERYLLIUM ACETATE, BASIC & GALLIUM & INDIUM & ZINC & WATER	No significant acute toxicological data identified in literature search.
COBALT & NICKEL	<b>WARNING:</b> This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

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

ICP multi-element standard solution XXI for MS	Endpoint	Test Duration (hr)	Species	Value	Source
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Continued...

## ICP multi-element standard solution XXI for MS

	Not Available	Not Available	Not Available	Not Available	Not Available
silver nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	BCF	792h	Fish	<54-310	7
	NOEC(ECx)	192h	Crustacea	0.000001mg/l	4
	EC50	96h	Algae or other aquatic plants	0.0099mg/l	2
	EC50	72h	Algae or other aquatic plants	0.0034mg/l	2
	LC50	96h	Fish	-0.0003mg/l	4
	EC50	48h	Crustacea	0.00026mg/l	2
aluminium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	LC50	96h	Fish	>0.105mg/l	2
	EC50	72h	Algae or other aquatic plants	0.075mg/l	2
	EC50	48h	Crustacea	0.33mg/l	2
	EC10(ECx)	72h	Algae or other aquatic plants	0.015mg/l	2
arsenic	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50	48h	Crustacea	0.0159mg/l	2
	EC10(ECx)	168h	Algae or other aquatic plants	0.0046mg/l	2
	EC50	96h	Algae or other aquatic plants	0.11-0.209mg/l	4
	EC50	72h	Algae or other aquatic plants	0.254mg/l	2
	LC50	96h	Fish	2.8-4.2mg/l	Not Available
barium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	LC50	96h	Fish	>3.5mg/l	2
	EC50	72h	Algae or other aquatic plants	>1.15mg/l	2
	EC50	48h	Crustacea	>=16<=18mg/l	2
	NOEC(ECx)	72h	Algae or other aquatic plants	>=1.15mg/l	2
beryllium acetate, basic	Not Available	Not Available	Not Available	Not Available	Not Available
bismuth	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	ErC50	72h	Algae or other aquatic plants	>1.26mg/l	2
	NOEC(ECx)	72h	Algae or other aquatic plants	1mg/l	2
	EC50	72h	Algae or other aquatic plants	>1.26mg/l	2
	LC50	96h	Fish	>100mg/l	2
	EC50	48h	Crustacea	>1.26mg/l	2
calcium carbonate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	1h	Fish	4-320mg/l	4
	LC50	96h	Fish	>165200mg/L	4
	EC50	72h	Algae or other aquatic plants	>14mg/l	2
cadmium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	672h	Fish	0.00002mg/l	4
	EC50	96h	Algae or other aquatic plants	0.049-0.162mg/l	4
	EC50	72h	Algae or other aquatic plants	0.018mg/l	2
	LC50	96h	Fish	4.2-6.9mg/l	Not Available
	EC50	48h	Crustacea	0.0054-0.0374mg/l	4
cobalt	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	0.01-0.015mg/l	1
	EC50	96h	Algae or other aquatic plants	23.8mg/l	2
	EC50	72h	Algae or other aquatic plants	0.0288mg/l	2
	LC50	96h	Fish	0.8mg/l	2
	EC50	48h	Crustacea	0.241mg/l	2

## ICP multi-element standard solution XXI for MS

caesium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	9.89mg/l	2
	EC50	72h	Algae or other aquatic plants	106.04mg/l	2
	LC50	96h	Fish	>79.14mg/l	2
copper	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	48h	Fish	0.00009mg/l	4
	EC50	96h	Algae or other aquatic plants	0.03-0.058mg/l	4
	EC50	72h	Algae or other aquatic plants	0.011-0.017mg/L	4
	LC50	96h	Fish	0.0028mg/l	2
ferric nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	LC50	96h	Fish	1010mg/l	2
	EC50	72h	Algae or other aquatic plants	18mg/l	2
gallium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	<0.3mg/l	2
	EC50	72h	Algae or other aquatic plants	0.63mg/l	2
	EC50	48h	Crustacea	14.96mg/l	2
indium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	72h	Algae or other aquatic plants	>0.00032mg/l	2
	EC50	72h	Algae or other aquatic plants	>0.00032mg/l	2
	LC50	96h	Fish	19.519mg/l	2
potassium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	144h	Fish	0.1mg/l	4
	LC50	96h	Fish	>100mg/l	2
lithium carbonate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	48h	Crustacea	33.2mg/l	Not Available
	EC50	72h	Algae or other aquatic plants	>400mg/l	2
	LC50	96h	Fish	30.3mg/l	Not Available
magnesium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	24h	Crustacea	6075mg/L	5
manganese(II) acetate tetrahydrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC10(ECx)	240h	Algae or other aquatic plants	~5.1mg/l	2
	LC50	96h	Fish	2850mg/l	2
	EC50	96h	Algae or other aquatic plants	31mg/l	2
sodium nitrate	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	1056h	Algae or other aquatic plants	0.2mg/l	4
	LC50	96h	Fish	7.1mg/l	4
nickel	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50(ECx)	72h	Algae or other aquatic plants	0.18mg/l	1
	EC50	96h	Algae or other aquatic plants	0.174-0.311mg/l	4
	EC50	72h	Algae or other aquatic plants	0.18mg/l	1
	LC50	96h	Fish	0.06mg/l	4
nickel	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	EC50	48h	Crustacea	>100mg/l	1

Continued...

## ICP multi-element standard solution XXI for MS

	Endpoint	Test Duration (hr)	Species	Value	Source
lead nitrate	LC50	96h	Fish	0.0079mg/l	2
	BCF	888h	Fish	72-250	7
	EC50	72h	Algae or other aquatic plants	0.0205mg/l	2
	EC50	48h	Crustacea	0.029mg/l	2
	NOEC(ECx)	96h	Fish	<0.001mg/L	4
	EC50	96h	Algae or other aquatic plants	1.755mg/L	4
rubidium nitrate	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	~20mg/l	2
	EC50	48h	Crustacea	~67mg/l	2
selenium dioxide	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	4320h	Fish	<0.005mg/l	2
	EC50	96h	Algae or other aquatic plants	0.0316mg/l	2
	EC50	72h	Algae or other aquatic plants	0.032-0.1mg/l	4
	LC50	96h	Fish	0.03mg/l	4
strontium nitrate	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96h	Fish	>40.3mg/l	2
	EC50	72h	Algae or other aquatic plants	>43.3mg/l	2
	EC50	48h	Crustacea	94mg/l	2
thallium	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	720h	Fish	0.04mg/L	5
	LC50	96h	Fish	1.8mg/l	4
	NOEC(ECx)	480h	Algae or other aquatic plants	15mg/l	2
vanadium pentoxide	Endpoint	Test Duration (hr)	Species	Value	Source
	BCF	672h	Fish	3.4-14	7
	LC50	96h	Fish	0.62mg/l	2
	EC50	72h	Algae or other aquatic plants	0.9894mg/l	2
	EC50	48h	Crustacea	0.349mg/l	2
uranyl acetate	Endpoint	Test Duration (hr)	Species	Value	Source
	NOEC(ECx)	48h	Fish	0.1mg/l	4
	LC50	96h	Fish	2.1-4mg/l	4
zinc	Endpoint	Test Duration (hr)	Species	Value	Source
	EC10(ECx)	168h	Algae or other aquatic plants	0.0025mg/l	2
	EC50	96h	Algae or other aquatic plants	0.042mg/l	2
	EC50	72h	Algae or other aquatic plants	0.005mg/l	4
	LC50	96h	Fish	0.01068-0.01413mg/l	4
nitric acid	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50(ECx)	96h	Crustacea	39mg/l	2
	LC50	96h	Fish	102.24mg/L	4
water	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	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

Although the components of an ecosystem can be divided into several major compartments, they function as a unit by means of connections or interchanges between them. Initial uranium deposition in a compartment, as well as exchanges between compartments (mobility), are dependent upon numerous factors such as chemical and physical form of the uranium, environmental media, organic material present, oxidation-reduction potential, nature of sorbing materials, and size and composition of sorbing particles. Environmental

Continued...



## ICP multi-element standard solution XXI for MS

concerns related to uranium generally arise following deliberate release (in munitions) and notably address concerns related to ionising radiation. Less well recognised is exposure to depleted forms of uranium resulting from radioactive decay.

**Ecotoxicity:**

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9.

Acute testing with fish showed 96h-LC50 at about pH 3.5

For Metal:

Atmospheric Fate - Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air.

Environmental Fate: Environmental processes, such as oxidation, the presence of acids or bases and microbiological processes, may transform insoluble metals to more soluble ionic forms. Environmental processes may enhance bioavailability and may also be important in changing solubilities.

Aquatic/Terrestrial Fate: When released to dry soil, most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. A metal ion is considered infinitely persistent because it cannot degrade further.

Speciation of arsenic is an important consideration in the fate, movement, and action of this substance. Chemical and biochemical transformations of arsenic include oxidation, reduction and methylation which affects its volatilisation, adsorption, dissolution and biological disposition. The transport of arsenic in the environment is largely controlled by absorption/desorption processes in soils and sediments. Sediment movement is responsible for transport of arsenic soil residues to their ultimate sinks in deep ocean sediments.

For Vanadium Compounds:

Environmental Fate: Vanadium is travels through the environment via long-range transportation in the atmosphere, water, and land by natural and man-made sources, wet and dry deposition, adsorption and complexing. From natural sources, vanadium is probably in the form of less soluble trivalent mineral particles.

Atmospheric Fate: Vanadium generally enters the atmosphere as an aerosol. Natural and man-made sources of vanadium tend to release large particles that are more likely to settle near the source.

**DO NOT discharge into sewer or waterways.**

**Persistence and degradability**

Ingredient	Persistence: Water/Soil	Persistence: Air
silver nitrate	LOW	LOW
aluminium nitrate	LOW	LOW
caesium nitrate	LOW	LOW
potassium nitrate	LOW	LOW
lithium carbonate	LOW	LOW
sodium nitrate	LOW	LOW
selenium dioxide	HIGH	HIGH
water	LOW	LOW

**Bioaccumulative potential**

Ingredient	Bioaccumulation
silver nitrate	MEDIUM (BCF = 600)
aluminium nitrate	LOW (LogKOW = 0.209)
caesium nitrate	LOW (LogKOW = 0.209)
potassium nitrate	LOW (LogKOW = 0.209)
lithium carbonate	LOW (LogKOW = -0.4605)
sodium nitrate	LOW (LogKOW = 0.209)
lead nitrate	LOW (BCF = 250)
selenium dioxide	LOW (LogKOW = -0.771)
vanadium pentoxide	LOW (BCF = 14)

**Mobility in soil**

Ingredient	Mobility
silver nitrate	LOW (KOC = 14.3)
aluminium nitrate	LOW (KOC = 14.3)
caesium nitrate	LOW (KOC = 14.3)
potassium nitrate	LOW (KOC = 14.3)
lithium carbonate	HIGH (KOC = 1)
sodium nitrate	LOW (KOC = 14.3)
selenium dioxide	LOW (KOC = 23.74)

**SECTION 13 Disposal considerations****Waste treatment methods**

<b>Product / Packaging disposal</b>	<ul style="list-style-type: none"> <li>▶ Containers may still present a chemical hazard/ danger when empty.</li> <li>▶ Return to supplier for reuse/ recycling if possible.</li> </ul> <p>Otherwise:</p> <ul style="list-style-type: none"> <li>▶ 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.</li> <li>▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> <li>▶ Recycle wherever possible.</li> <li>▶ 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.</li> <li>▶ 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 (after admixture with suitable combustible material).</li> </ul>
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## ICP multi-element standard solution XXI for MS

## SECTION 14 Transport information

## Labels Required

	
Marine Pollutant	NO
HAZCHEM	2X

## Land transport (ADG)

UN number	3264	
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Nitric acid solution)	
Transport hazard class(es)	Class	8
	Subrisk	Not Applicable
Packing group	III	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	223 274
	Limited quantity	5 L

## Air transport (ICAO-IATA / DGR)

UN number	3264	
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. * (Nitric acid solution)	
Transport hazard class(es)	ICAO/IATA Class	8
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	8L
Packing group	III	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A3 A803
	Cargo Only Packing Instructions	856
	Cargo Only Maximum Qty / Pack	60 L
	Passenger and Cargo Packing Instructions	852
	Passenger and Cargo Maximum Qty / Pack	5 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y841
Passenger and Cargo Limited Maximum Qty / Pack	1 L	

## Sea transport (IMDG-Code / GGVSee)

UN number	3264	
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Nitric acid solution)	
Transport hazard class(es)	IMDG Class	8
	IMDG Subrisk	Not Applicable
Packing group	III	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-A, S-B
	Special provisions	223 274
	Limited Quantities	5 L

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

Product name	Pollution Category	Ship Type
Nitric acid (less than 70%)	Y	2

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

Product name	Group
silver nitrate	Not Available
aluminium nitrate	Not Available
arsenic	Not Available

## ICP multi-element standard solution XXI for MS

Product name	Group
barium nitrate	Not Available
beryllium acetate, basic	Not Available
bismuth	Not Available
calcium carbonate	Not Available
cadmium	Not Available
cobalt	Not Available
caesium nitrate	Not Available
copper	Not Available
ferric nitrate	Not Available
gallium	Not Available
indium	Not Available
potassium nitrate	Not Available
lithium carbonate	Not Available
magnesium nitrate	Not Available
manganese(II) acetate tetrahydrate	Not Available
sodium nitrate	Not Available
nickel	Not Available
lead nitrate	Not Available
rubidium nitrate	Not Available
selenium dioxide	Not Available
strontium nitrate	Not Available
thallium	Not Available
vanadium pentoxide	Not Available
uranyl acetate	Not Available
zinc	Not Available
nitric acid	Not Available
water	Not Available

## Transport in bulk in accordance with the ICG Code

Product name	Ship Type
silver nitrate	Not Available
aluminium nitrate	Not Available
arsenic	Not Available
barium nitrate	Not Available
beryllium acetate, basic	Not Available
bismuth	Not Available
calcium carbonate	Not Available
cadmium	Not Available
cobalt	Not Available
caesium nitrate	Not Available
copper	Not Available
ferric nitrate	Not Available
gallium	Not Available
indium	Not Available
potassium nitrate	Not Available
lithium carbonate	Not Available
magnesium nitrate	Not Available
manganese(II) acetate tetrahydrate	Not Available
sodium nitrate	Not Available
nickel	Not Available
lead nitrate	Not Available
rubidium nitrate	Not Available
selenium dioxide	Not Available
strontium nitrate	Not Available
thallium	Not Available
vanadium pentoxide	Not Available
uranyl acetate	Not Available

## ICP multi-element standard solution XXI for MS

Product name	Ship Type
zinc	Not Available
nitric acid	Not Available
water	Not Available

## SECTION 15 Regulatory information

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

## silver nitrate 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 6  
 Australian Inventory of Industrial Chemicals (AIIC)

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 2A: Probably carcinogenic to humans

## aluminium nitrate 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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

## arsenic 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 4  
 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6  
 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7  
 Australian Inventory of Industrial Chemicals (AIIC)

FEI Equine Prohibited Substances List - Banned Substances  
 FEI Equine Prohibited Substances List (EPSSL)  
 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 1: Carcinogenic to humans  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## barium nitrate 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 6  
 Australian Inventory of Industrial Chemicals (AIIC)

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 2A: Probably carcinogenic to humans

## beryllium acetate, basic is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals  
 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 1: Carcinogenic to humans

## bismuth 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)

## calcium carbonate 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)

## cadmium is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals  
 Australia Model Work Health and Safety Regulations - Hazardous chemicals (other than lead) requiring health monitoring  
 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 1: Carcinogenic to humans  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## cobalt 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 4  
 Australian Inventory of Industrial Chemicals (AIIC)  
 Chemical Footprint Project - Chemicals of High Concern List  
 FEI Equine Prohibited Substances List - Controlled Medication

FEI Equine Prohibited Substances List (EPSSL)  
 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 2A: Probably carcinogenic to humans  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## caesium nitrate is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

## copper 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 4  
 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)  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## ferric nitrate is found on the following regulatory lists

## ICP multi-element standard solution XXI for MS

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 4

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

**gallium is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**indium is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**potassium nitrate 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

**lithium carbonate is found on the following regulatory lists**

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

**magnesium nitrate 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

**manganese(II) acetate tetrahydrate is found on the following regulatory lists**

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

**sodium nitrate 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

**nickel 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

**lead nitrate 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 6

Australian Inventory of Industrial Chemicals (AIIC)

**rubidium nitrate is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**selenium dioxide is found on the following regulatory lists**

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australian Inventory of Industrial Chemicals (AIIC)

**strontium nitrate 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

**thallium is found on the following regulatory lists**

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australia Model Work Health and Safety Regulations - Hazardous chemicals (other than lead) requiring health monitoring

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7

**vanadium pentoxide 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

**uranyl acetate 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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

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

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

Australian Inventory of Industrial Chemicals (AIIC)

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

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)

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 2A: Probably carcinogenic to humans

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans

Australian Inventory of Industrial Chemicals (AIIC)

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

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

Australian Inventory of Industrial Chemicals (AIIC)

## ICP multi-element standard solution XXI for MS

**zinc is found on the following regulatory lists**

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

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

**nitric acid 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

Australian Inventory of Industrial Chemicals (AIIC)

**water is found on the following regulatory lists**

Australian Inventory of Industrial Chemicals (AIIC)

**National Inventory Status**

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (beryllium acetate, basic)
Canada - DSL	No (beryllium acetate, basic; rubidium nitrate)
Canada - NDSL	No (silver nitrate; aluminium nitrate; arsenic; barium nitrate; beryllium acetate, basic; bismuth; cadmium; cobalt; caesium nitrate; copper; ferric nitrate; gallium; indium; potassium nitrate; lithium carbonate; magnesium nitrate; manganese(II) acetate tetrahydrate; sodium nitrate; nickel; lead nitrate; selenium dioxide; strontium nitrate; thallium; vanadium pentoxide; uranyl acetate; zinc; nitric acid; water)
China - IECSC	No (beryllium acetate, basic; rubidium nitrate; selenium dioxide)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (arsenic; beryllium acetate, basic; bismuth; cadmium; cobalt; copper; gallium; indium; manganese(II) acetate tetrahydrate; nickel; rubidium nitrate; thallium; uranyl acetate; zinc)
Korea - KECI	No (beryllium acetate, basic; uranyl acetate)
New Zealand - NZIoC	No (beryllium acetate, basic; rubidium nitrate)
Philippines - PICCS	No (beryllium acetate, basic)
USA - TSCA	No (beryllium acetate, basic)
Taiwan - TCSI	Yes
Mexico - INSQ	No (beryllium acetate, basic; rubidium nitrate; uranyl acetate)
Vietnam - NCI	No (beryllium acetate, basic; uranyl acetate)
Russia - FBEPH	No (beryllium acetate, basic)
<b>Legend:</b>	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**

<b>Revision Date</b>	23/01/2023
<b>Initial Date</b>	24/01/2023

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

**ICP multi-element standard solution XXI for MS**

INSQ: Inventario Nacional de Sustancias Químicas

NCI: National Chemical Inventory

FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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