

Certified Reference Material - Sea Water

High-Purity Standards

Catalogue number: CRM-SW
Version No: 1.1
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: **3**

Issue Date: **05/09/2017**
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S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Certified Reference Material - Sea Water
Synonyms	CRM-SW
Proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s.
Other means of identification	CRM-SW

Recommended use of the chemical and restrictions on use

Relevant identified uses	Use according to manufacturer's directions.
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Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	High-Purity Standards
Address	PO Box 41727 SC 29423 United States
Telephone	843-767-7900
Fax	843-767-7906
Website	highpuritystandards.com
Email	Not Available

Emergency phone number


Association / Organisation	INFOTRAC
Emergency telephone numbers	1-800-535-5053
Other emergency telephone numbers	1-352-323-3500

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Metal Corrosion Category 1, Skin Corrosion/Irritation Category 1A
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Label elements

Hazard pictogram(s)	
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SIGNAL WORD **DANGER**

Hazard statement(s)

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

Precautionary statement(s) Response

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Precautionary statement(s) Storage

P405 Store locked up.

Precautionary statement(s) Disposal

P501 Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7429-90-5	0.00005	<u>aluminium</u>
7440-38-2	0.000002	<u>arsenic</u>
7440-39-3	0.000005	<u>barium</u>
7440-42-8	0.0005	<u>boron</u>
7440-43-9	0.00000001	<u>cadmium</u>
7440-70-2	0.04	<u>calcium</u>
7440-47-3	0.00000003	<u>chromium</u>
7440-50-8	0.000001	<u>copper</u>
7440-57-5	0.0000000006	<u>gold</u>
7439-89-6	0.000002	<u>iron</u>
7439-92-1	0.0000004	<u>lead</u>
7439-93-2	0.00001	<u>lithium</u>
7439-95-4	0.125	<u>magnesium</u>
6156-78-1	0.000001	<u>manganese(II) acetate tetrahydrate</u>
7439-97-6	0.000000003	<u>mercury (elemental)</u>
13106-76-8	0.00000005	<u>ammonium molybdate</u>
7440-02-0	0.00000001	<u>nickel</u>
7722-76-1	0.00001	<u>ammonium phosphate, monobasic</u>
7440-09-7	0.038	<u>potassium</u>
7440-17-7	0.00002	<u>rubidium</u>
7440-20-2	0.000000004	<u>scandium</u>
7782-49-2	0.0000004	<u>selenium</u>
16919-19-0	0.0004	<u>ammonium fluorosilicate</u>
7440-22-4	0.00000003	<u>silver</u>
7440-23-5	1.05	<u>sodium</u>
7440-24-6	0.0012	<u>strontium</u>
7664-93-9	0.09	<u>sulfuric acid</u>
1344-59-8	0.00000015	<u>uranium mixed oxides (U3O8)</u>
7803-55-6	0.00000003	<u>ammonium metavanadate</u>
7440-66-6	0.0000005	<u>zinc</u>
12124-97-9	0.0065	<u>ammonium bromide</u>
144-62-7	0.003	<u>oxalic acid</u>
7647-14-5	1.9	<u>sodium chloride</u>
12027-06-4	0.000005	<u>ammonium iodide</u>
7697-37-2	2	<u>nitric acid</u>
7732-18-5	balance	<u>water</u>

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact

If this product comes in contact with the eyes:
 ▶ Immediately hold eyelids apart and flush the eye continuously with running water.

	<ul style="list-style-type: none"> ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor. <p>For thermal burns:</p> <ul style="list-style-type: none"> ▶ Decontaminate area around burn. ▶ Consider the use of cold packs and topical antibiotics. <p>For first-degree burns (affecting top layer of skin)</p> <ul style="list-style-type: none"> ▶ Hold burned skin under cool (not cold) running water or immerse in cool water until pain subsides. ▶ Use compresses if running water is not available. ▶ Cover with sterile non-adhesive bandage or clean cloth. ▶ Do NOT apply butter or ointments; this may cause infection. ▶ Give over-the counter pain relievers if pain increases or swelling, redness, fever occur. <p>For second-degree burns (affecting top two layers of skin)</p> <ul style="list-style-type: none"> ▶ Cool the burn by immerse in cold running water for 10-15 minutes. ▶ Use compresses if running water is not available. ▶ Do NOT apply ice as this may lower body temperature and cause further damage. ▶ Do NOT break blisters or apply butter or ointments; this may cause infection. ▶ Protect burn by cover loosely with sterile, nonstick bandage and secure in place with gauze or tape. <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"> ▶ Lay the person flat. ▶ Elevate feet about 12 inches. ▶ Elevate burn area above heart level, if possible. ▶ Cover the person with coat or blanket. ▶ Seek medical assistance. <p>For third-degree burns Seek immediate medical or emergency assistance.</p> <p>In the mean time:</p> <ul style="list-style-type: none"> ▶ 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. ▶ Separate burned toes and fingers with dry, sterile dressings. ▶ Do not soak burn in water or apply ointments or butter; this may cause infection. ▶ To prevent shock see above. ▶ For an airway burn, do not place pillow under the person's head when the person is lying down. This can close the airway. ▶ Have a person with a facial burn sit up. ▶ Check pulse and breathing to monitor for shock until emergency help arrives.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay. ▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema. ▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs). ▶ As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested. ▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered. <p>This must definitely be left to a doctor or person authorised by him/her. (ICSC13719)</p>
Ingestion	<ul style="list-style-type: none"> ▶ For advice, contact a Poisons Information Centre or a doctor at once. ▶ Urgent hospital treatment is likely to be needed. ▶ If swallowed do NOT induce vomiting. ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▶ Observe the patient carefully. ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▶ Transport to hospital or doctor without delay.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

- ▶ Effective therapy against burns from oxalic acid involves replacement of calcium.
- ▶ Intravenous oxalic acid is substantially excreted (88% - 90%) in the urine within 36 hours.

For acute or short term repeated exposures to strong acids:

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

INGESTION:

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

SKIN:

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

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any**

- ▶ **other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIRE-FIGHTING 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

Fire Incompatibility	None known.
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Special protective equipment and precautions for fire-fighters

Fire Fighting	
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered to be a significant fire risk. ▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. ▶ May emit corrosive, poisonous fumes. May emit acrid smoke. <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.</p>

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	<ul style="list-style-type: none"> ▶ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material. ▶ Check regularly for spills and leaks. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with sand, earth, inert material or vermiculite. ▶ Wipe up. ▶ Place in a suitable, labelled container for waste disposal.
Major Spills	#

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. ▶ WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. ▶ Avoid smoking, naked lights or ignition sources. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Avoid physical damage to containers. ▶ Always wash hands with soap and water after handling. ▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▶ Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
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. ▶ Protect containers against physical damage and check regularly for leaks. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Check regularly for spills and leaks
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	<ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> ▶ Removable head packaging; ▶ Cans with friction closures and ▶ low pressure tubes and cartridges <p>may be used.</p> <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p>
Storage incompatibility	<p>For aluminas (aluminium oxide):</p> <p>Incompatible with hot chlorinated rubber.</p> <p>In the presence of chlorine trifluoride may react violently and ignite.</p> <p>-May initiate explosive polymerisation of olefin oxides including ethylene oxide.</p> <p>-Produces exothermic reaction above 200 C with halocarbons and an exothermic reaction at ambient temperatures with halocarbons in the presence of other metals.</p> <p>-Produces exothermic reaction with oxygen difluoride.</p> <p>-May form explosive mixture with oxygen difluoride.</p> <p>-Forms explosive mixtures with sodium nitrate.</p> <p>-Reacts vigorously with vinyl acetate.</p> <p>Aluminium oxide is an amphoteric substance, meaning it can react with both acids and bases, such as hydrofluoric acid and sodium hydroxide, acting as an acid with a base and a base with an acid, neutralising the other and producing a salt.</p> <p>Oxalic acid (and its dihydrate):</p> <ul style="list-style-type: none"> ▶ react violently with strong oxidisers, bromine, furfuryl alcohol, hydrogen peroxide (90%), phosphorous trichloride, silver powders ▶ reacts explosively with chlorites and hypochlorites ▶ mixture with some silver compounds form explosive salts of silver oxalate ▶ is incompatible with caustics and alkalis, urea, alkaline metals and steel ▶ attacks polyvinyl alcohol and acetal plastics ▶ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0. ▶ Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces. ▶ The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat. ▶ The addition of water to inorganic acids often generates sufficient heat in the small region of mixing to cause some of the water to boil explosively. The resulting "bumping" can spatter the acid. ▶ Inorganic acids react with active metals, including such structural metals as aluminum and iron, to release hydrogen, a flammable gas. ▶ Inorganic acids can initiate the polymerisation of certain classes of organic compounds. ▶ Inorganic acids react with cyanide compounds to release gaseous hydrogen cyanide. ▶ Inorganic acids generate flammable and/or toxic gases in contact with dithiocarbamates, isocyanates, mercaptans, nitrides, nitriles, sulfides, and strong reducing agents. Additional gas-generating reactions occur with sulfites, nitrites, thiosulfates (to give H₂S and SO₃), dithionites (SO₂), and even carbonates. ▶ Acids often catalyse (increase the rate of) chemical reactions. ▶ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. ▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	aluminium	Aluminum, metal / Aluminum, metal-Respirable fraction	15 mg/m ³ / 5 mg/m ³	Not Available	Not Available	Total dust; (as Al) / (as Al)
US ACGIH Threshold Limit Values (TLV)	aluminium	Aluminum metal and insoluble compounds	1 mg/m ³	Not Available	Not Available	TLV® Basis: Pneumoconiosis; LRT irr; neurotoxicity
US NIOSH Recommended Exposure Limits (RELs)	aluminium	Aluminium, Aluminum metal, Aluminum powder, Elemental aluminum	10 (total), 5 (resp) mg/m ³	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	arsenic	Arsenic-inorganic compounds	0.01 mg/m ³	Not Available	Not Available	see 1910.1018;(as As)
US ACGIH Threshold Limit Values (TLV)	arsenic	Arsenic and inorganic compounds, as As	0.01 mg/m ³	Not Available	Not Available	TLV® Basis: Lung cancer; BEI
US NIOSH Recommended Exposure Limits (RELs)	arsenic	Arsenic metal: Arsenia	Not Available	Not Available	0.002 mg/m ³	Ca See Appendix A
US OSHA Permissible Exposure Levels (PELs) - Table Z1	barium	Barium, soluble compounds	0.5 mg/m ³	Not Available	Not Available	(as Ba)

US ACGIH Threshold Limit Values (TLV)	barium	Barium and soluble compounds, as Ba(1990)	0.5 mg/m3	Not Available	Not Available	TLV® Basis: Eye, skin, & GI irr; muscular stim
US OSHA Permissible Exposure Levels (PELs) - Table Z1	cadmium	Cadmium	0.005 mg/m3	Not Available	Not Available	see 1910.1027;(as Cd)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	cadmium	Cadmium fume / Cadmium dust	0.1 mg/m3 / 0.2 mg/m3	Not Available	0.3 mg/m3 / 0.6 mg/m3	(Z37.5–1970);This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect
US ACGIH Threshold Limit Values (TLV)	cadmium	Cadmium	0.01 mg/m3	Not Available	Not Available	TLV® Basis: Kidney dam; BEI
US NIOSH Recommended Exposure Limits (RELs)	cadmium	Cadmium metal: Cadmium	Not Available	Not Available	Not Available	Ca See Appendix A [*Note: The REL applies to all Cadmium compounds (as Cd).]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	chromium	Chromium metal and insol. salts	1 mg/m3	Not Available	Not Available	(as Cr)
US ACGIH Threshold Limit Values (TLV)	chromium	Chromium, and inorganic compounds, as Cr - Metal and Cr III compounds	0.5 mg/m3	Not Available	Not Available	TLV® Basis: URT & skin irr
US NIOSH Recommended Exposure Limits (RELs)	chromium	Chrome, Chromium	0.5 mg/m3	Not Available	Not Available	See Appendix C
US OSHA Permissible Exposure Levels (PELs) - Table Z1	copper	Copper - Fume / Copper	0.1 mg/m3 / 1 mg/m3	Not Available	Not Available	(as Cu) / (as Cu);Dusts and mists
US ACGIH Threshold Limit Values (TLV)	copper	Copper - Fume, as Cu / Copper - Dusts and mists, as Cu	0.2 mg/m3 / 1 mg/m3	Not Available	Not Available	TLV® Basis: Irr; GI; metal fume fever; BEI
US NIOSH Recommended Exposure Limits (RELs)	copper	Copper metal dusts, Copper metal fumes	1 mg/m3	Not Available	Not Available	[*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	lead	Lead, inorganic	0.05 mg/m3	Not Available	Not Available	(as Pb);see 1910.1025;if an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula: Maximum permissible limit (in µg/m3)=400÷hours worked in the day.
US ACGIH Threshold Limit Values (TLV)	lead	Lead and inorganic compounds, as Pb	0.05 mg/m3	Not Available	Not Available	TLV® Basis: CNS & PNS impair; hematologic eff; BEI
US NIOSH Recommended Exposure Limits (RELs)	lead	Lead metal, Plumbum	0.050 mg/m3	Not Available	Not Available	See Appendix C [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	manganese(II) acetate tetrahydrate	Manganese compounds / Manganese fume	Not Available	Not Available	5 mg/m3	(as Mn)
US OSHA Permissible Exposure Levels (PELs) - Table Z1	mercury (elemental)	Mercury (vapor)	Not Available	Not Available	Not Available	See Table Z-2;(as Hg)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	mercury (elemental)	Mercury	Not Available	Not Available	0.1 mg/m3	(Z37.8–1971)
US ACGIH Threshold Limit Values (TLV)	mercury (elemental)	Mercury, all forms except alkyl, as Hg - Elemental and inorganic forms	0.025 mg/m3	Not Available	Not Available	TLV® Basis: CNS impair; kidney dam; BEI
US NIOSH Recommended Exposure Limits (RELs)	mercury (elemental)	Mercury metal: Colloidal mercury, Metallic mercury, Quicksilver	Hg Vapor: 0.05 mg/m3	Not Available	Other:0.1 mg/m3	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	ammonium molybdate	Molybdenum - Soluble compounds	5 mg/m3	Not Available	Not Available	(as Mo)
US NIOSH Recommended Exposure Limits (RELs)	ammonium molybdate	Synonyms vary depending upon the specific soluble molybdenum compound.	Not Available	Not Available	Not Available	See Appendix D
US OSHA Permissible Exposure Levels (PELs) - Table Z1	nickel	Nickel, metal and insoluble compounds	1 mg/m3	Not Available	Not Available	(as Ni)
US ACGIH Threshold Limit Values (TLV)	nickel	Nickel and inorganic compounds including Nickel subsulfide, as Ni - Elemental	1.5 mg/m3	Not Available	Not Available	TLV® Basis: Dermatitis; pneumoconiosis

US NIOSH Recommended Exposure Limits (RELs)	nickel	Nickel metal: Elemental nickel, Nickel catalyst	0.015 mg/m3	Not Available	Not Available	Ca See Appendix A [*Note: The REL does not apply to Nickel carbonyl.]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	selenium	Selenium compounds	0.2 mg/m3	Not Available	Not Available	(as Se)
US ACGIH Threshold Limit Values (TLV)	selenium	Selenium and compounds, as Se	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	selenium	Elemental selenium, Selenium alloy	0.2 mg/m3	Not Available	Not Available	[*Note: The REL also applies to other selenium compounds (as Se) except Selenium hexafluoride.]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	ammonium fluorosilicate	Silicates - Mica / Silicates - Soapstone / Silicates- Soapstone / Silicates - Talc / Silicates - Tremolite, asbestiform	0.1 mg/m3	Not Available	Not Available	See Table Z-3;less than 1% crystalline silica(respirable dust) / See Table Z-3;less than 1% crystalline silica, total dust / See Table Z-3;less than 1% crystalline silica, respirable dust / less than 1% crystalline silica;see 29 CFR 1910.1001;See Table Z-3;(containing asbestos); use asbestos limit; (STEL (Excursion limit)(as averaged over a sampling period of 30 minutes)) / less than 1% crystalline silica;See Table Z-3, (containing no asbestos), respirable dust / (as quartz), respirable dust;ess than 1% crystalline silica;see 1910.1001;(STEL (Excursion limit)(as averaged over a sampling period of 30 minutes))
US OSHA Permissible Exposure Levels (PELs) - Table Z1	ammonium fluorosilicate	Fluorides	2.5 mg/m3	Not Available	Not Available	as F)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	ammonium fluorosilicate	Fluoride as dust	2.5 mg/m3	Not Available	Not Available	(Z37.28-1969)
US OSHA Permissible Exposure Levels (PELs) - Table Z1	silver	Silver, metal and soluble compounds	0.01 mg/m3	Not Available	Not Available	(as Ag)
US ACGIH Threshold Limit Values (TLV)	silver	Silver, and compounds - Metal, dust and fume	0.1 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
US ACGIH Threshold Limit Values (TLV)	silver	Silver, and compounds - Soluble compounds, as Ag	0.01 mg/m3	Not Available	Not Available	TLV® Basis: Argyria
US NIOSH Recommended Exposure Limits (RELs)	silver	Silver metal: Argentum	0.01 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfuric acid	Sulfuric acid	1 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	sulfuric acid	Sulfuric acid	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Pulm func
US NIOSH Recommended Exposure Limits (RELs)	sulfuric acid	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)	1 mg/m3	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	uranium mixed oxides (U3O8)	Uranium - Insoluble compounds	0.25 mg/m3	Not Available	Not Available	(as U)
US ACGIH Threshold Limit Values (TLV)	uranium mixed oxides (U3O8)	Uranium (natural) Soluble and insoluble compounds, as U	0.2 mg/m3	0.6 mg/m3	Not Available	TLV® Basis: Kidney dam; BEI
US OSHA Permissible Exposure Levels (PELs) - Table Z1	oxalic acid	Oxalic acid	1 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	oxalic acid	* Oxalic acid, anhydrous	1 mg/m3	2 mg/m3	Not Available	TLV® Basis: URT, eye, & skin irr
US NIOSH Recommended Exposure Limits (RELs)	oxalic acid	Ethanedioic acid, Oxalic acid (aqueous), Oxalic acid dihydrate	1 mg/m3	2 mg/m3	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	nitric acid	Nitric acid	5 mg/m3 / 2 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	nitric acid	Nitric acid	2 ppm	4 ppm	Not Available	TLV® Basis: URT & eye irr; dental erosion
US NIOSH Recommended Exposure Limits (RELs)	nitric acid	Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA)	5 mg/m3 / 2 ppm	10 mg/m3 / 4 ppm	Not Available	Not Available


EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
barium	Barium	1.5 mg/m3	180 mg/m3	1,100 mg/m3
boron	Boron	1.9 mg/m3	21 mg/m3	130 mg/m3
cadmium	Cadmium	Not Available	Not Available	Not Available
chromium	Chromium	1.5 mg/m3	17 mg/m3	99 mg/m3
copper	Copper	3 mg/m3	33 mg/m3	200 mg/m3
gold	Gold	0.46 mg/m3	5.1 mg/m3	30 mg/m3
iron	Iron	3.2 mg/m3	35 mg/m3	150 mg/m3
lead	Lead	0.15 mg/m3	120 mg/m3	700 mg/m3
lithium	Lithium	3.3 mg/m3	36 mg/m3	220 mg/m3
magnesium	Magnesium	18 mg/m3	200 mg/m3	1,200 mg/m3
manganese(II) acetate tetrahydrate	Acetic acid, manganese(2+) salt, tetrahydrate	13 mg/m3	22 mg/m3	740 mg/m3
manganese(II) acetate tetrahydrate	Acetic acid, manganese(II) salt (2:1)	9.4 mg/m3	16 mg/m3	96 mg/m3
mercury (elemental)	Mercury vapor	0.15 mg/m3	Not Available	Not Available
ammonium molybdate	Molybdic acid, hexaammonium salt; (Ammonium heptamolybdate)	2.6 mg/m3	230 mg/m3	1,400 mg/m3
ammonium molybdate	Ammonium molybdate(VI) tetrahydrate	2.8 mg/m3	30 mg/m3	180 mg/m3
ammonium molybdate	Ammonium molybdate; (Diammonium molybdate)	3.1 mg/m3	22 mg/m3	130 mg/m3
nickel	Nickel	4.5 mg/m3	50 mg/m3	99 mg/m3
ammonium phosphate, monobasic	Ammonium dihydrogen phosphate; (Monoammonium phosphate)	17 mg/m3	190 mg/m3	1,100 mg/m3
potassium	Potassium	2.3 mg/m3	25 mg/m3	150 mg/m3
rubidium	Rubidium	3.9 mg/m3	43 mg/m3	260 mg/m3
scandium	Scandium	30 mg/m3	330 mg/m3	2,000 mg/m3
selenium	Selenium	0.6 mg/m3	6.6 mg/m3	40 mg/m3
ammonium fluorosilicate	Ammonium hexafluorosilicate; (Ammonium silicofluoride)	12 mg/m3	130 mg/m3	780 mg/m3
silver	Silver	0.3 mg/m3	170 mg/m3	990 mg/m3
sodium	Sodium	13 mg/m3	140 mg/m3	870 mg/m3
strontium	Strontium	30 mg/m3	330 mg/m3	2,000 mg/m3
sulfuric acid	Sulfuric acid	Not Available	Not Available	Not Available
uranium mixed oxides (U3O8)	Uranium oxide; (Triuranium octaoxide)	0.71 mg/m3	Not Available	Not Available
ammonium metavanadate	Ammonium vanadate; (Ammonium vanadium oxide; Ammonium metavanadate)	0.01 mg/m3	0.11 mg/m3	80 mg/m3
zinc	Zinc	6 mg/m3	21 mg/m3	120 mg/m3
ammonium bromide	Ammonium bromide	8.1 mg/m3	89 mg/m3	530 mg/m3
oxalic acid	Oxalic acid, anhydrous; (Ethanedioic acid)	2 mg/m3	20 mg/m3	500 mg/m3
sodium chloride	Chloride; (Chloride(1-); Chloride ions)	0.5 ppm	2 ppm	20 ppm
ammonium iodide	Ammonium iodide	5.3 mg/m3	58 mg/m3	350 mg/m3
nitric acid	Nitric acid	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
aluminium	Not Available	Not Available
arsenic	100 mg/m3	5 mg/m3
barium	1,100 mg/m3	50 mg/m3
boron	Not Available	Not Available
cadmium	50 mg/m3 / 9 mg/m3	9 mg/m3 / 9 [Unch] mg/m3
calcium	Not Available	Not Available
chromium	N.E. / N.E.	250 mg/m3
copper	N.E. / N.E.	100 mg/m3
gold	Not Available	Not Available
iron	Not Available	Not Available
lead	700 mg/m3	100 mg/m3
lithium	Not Available	Not Available
magnesium	Not Available	Not Available
manganese(II) acetate tetrahydrate	N.E. / N.E.	500 mg/m3
mercury (elemental)	10 mg/m3 / 28 mg/m3	2 mg/m3 / 10 mg/m3
ammonium molybdate	N.E. / N.E.	1,000 mg/m3
nickel	N.E. / N.E.	10 mg/m3
ammonium phosphate, monobasic	Not Available	Not Available

potassium	Not Available	Not Available
rubidium	Not Available	Not Available
scandium	Not Available	Not Available
selenium	Unknown mg/m3 / Unknown ppm	1 mg/m3
ammonium fluorosilicate	Not Available	Not Available
silver	N.E. / N.E.	10 mg/m3
sodium	Not Available	Not Available
strontium	Not Available	Not Available
sulfuric acid	80 mg/m3	15 mg/m3
uranium mixed oxides (U3O8)	30 mg/m3	10 mg/m3
ammonium metavanadate	Not Available	Not Available
zinc	Not Available	Not Available
ammonium bromide	Not Available	Not Available
oxalic acid	500 mg/m3	500 [Unch] mg/m3
sodium chloride	Not Available	Not Available
ammonium iodide	Not Available	Not Available
nitric acid	100 ppm	25 ppm
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection.</p> <p>Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.</p> <p>An approved self contained breathing apparatus (SCBA) may be required in some situations.</p> <p>Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p>																			
	<table border="1"> <thead> <tr> <th>Type of Contaminant:</th> <th>Air Speed:</th> </tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td> <td>0.25-0.5 m/s (50-100 f/min.)</td> </tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td> <td>0.5-1 m/s (100-200 f/min.)</td> </tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td> <td>1-2.5 m/s (200-500 f/min.)</td> </tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td> <td>2.5-10 m/s (500-2000 f/min.)</td> </tr> </tbody> </table> <p>Within each range the appropriate value depends on:</p> <table border="1"> <thead> <tr> <th>Lower end of the range</th> <th>Upper end of the range</th> </tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td> <td>1: Disturbing room air currents</td> </tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only.</td> <td>2: Contaminants of high toxicity</td> </tr> <tr> <td>3: Intermittent, low production.</td> <td>3: High production, heavy use</td> </tr> <tr> <td>4: Large hood or large air mass in motion</td> <td>4: Small hood-local control only</td> </tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	Lower end of the range	Upper end of the range	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents	2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity	3: Intermittent, low production.	3: High production, heavy use	4: Large hood or large air mass in motion
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Personal protection																				
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▶ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. ▶ Alternatively a gas mask may replace splash goggles and face shields. ▶ 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. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be 																			

	<ul style="list-style-type: none"> readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	<ul style="list-style-type: none"> Elbow length PVC gloves When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> Overalls. PVC Apron. PVC protective suit may be required if exposure severe. Eyewash unit. Ensure there is ready access to a safety shower.
Thermal hazards	Not Available

Respiratory protection

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

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

Appearance	Grey		
Physical state	Liquid	Relative density (Water = 1)	Not Available
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	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)	Not Available	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Available	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water (g/L)	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> Contact with alkaline material liberates heat
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>The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. 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>Inhalation of oxalic acid dusts or vapours can cause ulceration of the linings of the nose and throat, nosebleed, headache and nervousness. The airborne dust behaves as a strong acid producing severe local burns of the linings of the nose and throat.</p> <p>The material has NOT been classified by EC Directives or other classification systems as "harmful by inhalation". This is because of the lack of corroborating animal or human evidence.</p>
Ingestion	<p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.</p> <p>Oxalic acid is a minor, normal body constituent occurring in blood, kidney, muscle and liver at very low concentrations. Higher concentrations are toxic. Ingestion of 5 grams has caused death within hours. It is a poison which affects the central nervous system and kidney function. Low doses may cause low blood calcium concentration.</p>

	The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	<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. Skin contact is not thought to have harmful health effects (as classified under EC Directives); 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>Solutions of 5% to 10% oxalic acid are irritating to the skin after prolonged contact; early gangrene may occur after hand immersion in oxalate solutions.</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>
Eye	<p>If applied to the eyes, this material causes severe eye damage.</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 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>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</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>

Certified Reference Material - Sea Water	TOXICITY	IRRITATION
	Not Available	Not Available
aluminium	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
arsenic	TOXICITY	IRRITATION
	Oral (rat) LD50: 763 mg/kg ^[2]	Not Available
barium	TOXICITY	IRRITATION
	Not Available	Not Available
boron	TOXICITY	IRRITATION
	Oral (rat) LD50: 650 mg/kg ^[2]	Not Available
cadmium	TOXICITY	IRRITATION
	Oral (rat) LD50: >63<259 mg/kg ^[1]	Not Available
calcium	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >2500 mg/kg ^[1]	Not Available
	Oral (rat) LD50: >2000 mg/kg ^[1]	
chromium	TOXICITY	IRRITATION
	Not Available	Not Available
copper	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available
	Inhalation (rat) LC50: 0.733 mg/l/4hr ^[1]	
	Inhalation (rat) LC50: 1.03 mg/l/4hr ^[1]	
	Inhalation (rat) LC50: 1.67 mg/l/4hr ^[1]	
gold	TOXICITY	IRRITATION
	Not Available	Not Available
iron	TOXICITY	IRRITATION
	Oral (rat) LD50: 98600 mg/kg ^[2]	Not Available

Certified Reference Material - Sea Water

lead	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available
	Inhalation (rat) LC50: >5.05 mg/l/4hr ^[1]	
	Oral (rat) LD50: >2000 mg/kg ^[1]	
lithium	TOXICITY	IRRITATION
	Not Available	Not Available
magnesium	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
manganese(II) acetate tetrahydrate	TOXICITY	IRRITATION
	Oral (rat) LD50: 3730 mg/kg ^[2]	Not Available
mercury (elemental)	TOXICITY	IRRITATION
	Oral (rat) LD50: >9.2 mg/kg ^[1]	Not Available
ammonium molybdate	TOXICITY	IRRITATION
	Oral (rat) LD50: 333 mg/kg ^[2]	Not Available
nickel	TOXICITY	IRRITATION
	Oral (rat) LD50: 5000 mg/kg ^[2]	Not Available
ammonium phosphate, monobasic	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[1]	Not Available
	Oral (rat) LD50: >2000 mg/kg ^[1]	
potassium	TOXICITY	IRRITATION
	Not Available	Not Available
rubidium	TOXICITY	IRRITATION
	Not Available	Not Available
scandium	TOXICITY	IRRITATION
	Not Available	Not Available
selenium	TOXICITY	IRRITATION
	Oral (rat) LD50: 6700 mg/kg ^[2]	Not Available
ammonium fluorosilicate	TOXICITY	IRRITATION
	Oral (mouse) LD50: 70 mg/kg ^[2]	Not Available
silver	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
sodium	TOXICITY	IRRITATION
	Not Available	Not Available
strontium	TOXICITY	IRRITATION
	Not Available	Not Available

Certified Reference Material - Sea Water

sulfuric acid	TOXICITY	IRRITATION
	Oral (rat) LD50: 2140 mg/kg ^[2]	Eye (rabbit): 1.38 mg SEVERE Eye (rabbit): 5 mg/30sec SEVERE
uranium mixed oxides (U3O8)	TOXICITY	IRRITATION
	Not Available	Not Available
ammonium metavanadate	TOXICITY	IRRITATION
	dermal (rat) LD50: 2102 mg/kg ^[2] Oral (rat) LD50: 160 mg/kg ^[2]	Not Available
zinc	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 1130 mg/kg ^[2] Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
ammonium bromide	TOXICITY	IRRITATION
	Oral (rat) LD50: 2700 mg/kg ^[2]	Not Available
oxalic acid	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 2000 mg/kg ^[2] Oral (rat) LD50: 475 mg/kg ^[2]	Not Available
sodium chloride	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >10000 mg/kg ^[1] Oral (rat) LD50: 3000 mg/kg ^[2]	Eye (rabbit): 10 mg - moderate Eye (rabbit): 100 mg/24h - moderate Skin (rabbit): 500 mg/24h - mild
ammonium iodide	TOXICITY	IRRITATION
	Not Available	Not Available
nitric acid	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 625 ppm/1h ^{*[2]}	Not Available
water	TOXICITY	IRRITATION
	Not Available	Not Available

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

ARSENIC	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. WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS . Tumorigenic - Carcinogenic by RTECS criteria.
BORON	Elemental boron produces lower foetal body weight in rats.
CALCIUM	The solid may react violently on contact with wet skin tissue, i.e. eyes, mouth, causing chemical and thermal burns. The acute effects include burns, ulceration, or tissue death, severe eye damage (corneal burns or opacification), and probable blindness. Inhalation of dust or fumes (especially from a fire involving calcium) will cause shortness of breath, nausea, headache, nose and respiratory tract irritation and in extreme, pneumonitis
CHROMIUM	On skin and inhalation exposure, chromium and its compounds (except hexavalent) can be a potent sensitiser, as particulates. Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic [National Toxicology Program: U.S. Dep. Gastrointestinal tumours, lymphoma, musculoskeletal tumours and tumours at site of application recorded.
COPPER	for copper and its compounds (typically copper chloride): Acute toxicity: There are no reliable acute oral toxicity results available. WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. tiredness, influenza like respiratory tract irritation with fever.
GOLD	Substance has been investigated as a tumorigen by implantation in rodents:
LEAD	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.

MERCURY (ELEMENTAL)	Animal studies have shown that mercury may be a reproductive effector.
AMMONIUM MOLYBDATE	For ammonium dimolybdate: (CAS 27546-07-2) Positive reaction in 20% of experimental animals (OECD 406; GPMT according to Magnuson-Kligman)
NICKEL	WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. Oral (rat) TDL _o : 500 mg/kg/5D-I Inhalation (rat) TCL _o : 0.1 mg/m ³ /24H/17W-C
SCANDIUM	Scandium metal on its own is not considered to be toxic.
SULFURIC ACID	WARNING: For inhalation exposure <u>ONLY</u> : This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS Occupational exposures to strong inorganic acid mists of sulfuric acid:
URANIUM MIXED OXIDES (U3O8)	Oral (rat) LD(?): > 4000 mg/kg Toxic effects not reported 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 ⁻² 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 ⁻² per quarter inhalation; critical organ being the kidneys.
SODIUM CHLORIDE	The material may produce moderate eye irritation leading to inflammation.
AMMONIUM IODIDE	None available.
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. The material may produce severe irritation to the eye causing pronounced inflammation. 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. Oral (?) LD50: 50-500 mg/kg * [Various Manufacturers]
ALUMINIUM & BARIUM & CALCIUM & CHROMIUM & LITHIUM & AMMONIUM PHOSPHATE, MONOBASIC & POTASSIUM & SODIUM & STRONTIUM & WATER	No significant acute toxicological data identified in literature search.
BARIUM & BORON & CALCIUM & LITHIUM & MANGANESE(II) ACETATE TETRAHYDRATE & MERCURY (ELEMENTAL) & AMMONIUM MOLYBDATE & AMMONIUM PHOSPHATE, MONOBASIC & POTASSIUM & RUBIDIUM & SCANDIUM & SODIUM & SULFURIC ACID & AMMONIUM METAVANADATE & OXALIC ACID & SODIUM CHLORIDE & AMMONIUM IODIDE & NITRIC ACID	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
CHROMIUM & SELENIUM	The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans.
AMMONIUM MOLYBDATE & NICKEL	The following information refers to contact allergens as a group and may not be specific to this product.
ZINC & SODIUM CHLORIDE	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.

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 available but does not fill the criteria for classification
✓ – Data available to make classification
☒ – Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Certified Reference Material - Sea Water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		Not Applicable	Not Applicable	Not Applicable	Not Applicable

aluminium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	0.078-0.108mg/L

	EC50	48	Crustacea	0.7364mg/L	2
	EC50	96	Algae or other aquatic plants	0.0054mg/L	2
	BCF	360	Algae or other aquatic plants	9mg/L	4
	EC50	120	Fish	0.000051mg/L	5
	NOEC	72	Algae or other aquatic plants	>=0.004mg/L	2

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
arsenic	LC50	96	Fish	9.9mg/L	4
	EC50	336	Algae or other aquatic plants	0.63mg/L	4
	NOEC	336	Algae or other aquatic plants	<0.75mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
barium	LC50	96	Fish	>500mg/L	4
	EC50	96	Algae or other aquatic plants	26mg/L	4
	BCF	24	Crustacea	0.000002mg/L	4
	EC50	240	Algae or other aquatic plants	8.10306mg/L	4
	NOEC	48	Crustacea	68mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
boron	LC50	96	Fish	74mg/L	2
	EC50	48	Crustacea	230mg/L	5
	EC50	72	Algae or other aquatic plants	54mg/L	2
	BCF	336	Algae or other aquatic plants	8.5mg/L	4
	EC50	336	Algae or other aquatic plants	8.5mg/L	4
	NOEC	576	Fish	0.001mg/L	5

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
cadmium	LC50	96	Fish	0.001mg/L	4
	EC50	48	Crustacea	0.0033mg/L	5
	EC50	72	Algae or other aquatic plants	0.018mg/L	2
	BCF	960	Fish	500mg/L	4
	EC50	336	Crustacea	0.00065mg/L	5
	NOEC	168	Fish	0.00001821mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
calcium	EC50	24	Crustacea	6934mg/L	5
	NOEC	48	Crustacea	33.3mg/L	2

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
chromium	LC50	96	Fish	13.9mg/L	4
	EC50	48	Crustacea	0.0225mg/L	5
	EC50	72	Algae or other aquatic plants	0.104mg/L	4
	BCF	1440	Algae or other aquatic plants	0.0495mg/L	4
	EC50	48	Crustacea	0.0245mg/L	5
	NOEC	672	Fish	0.00019mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
copper	LC50	96	Fish	0.0028mg/L	2
	EC50	48	Crustacea	0.001mg/L	5
	EC50	72	Algae or other aquatic plants	0.013335mg/L	4
	BCF	960	Fish	200mg/L	4
	EC50	96	Crustacea	0.001mg/L	5
	NOEC	96	Crustacea	0.0008mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
gold	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 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

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 Fluorides: Small amounts of fluoride have beneficial effects however; excessive intake over long periods may cause dental and/or skeletal fluorosis. Fluorides are absorbed by humans following inhalation of workplace and ambient air that has been contaminated, ingestion of drinking water and foods and dermal contact. Populations living in areas with high fluoride levels in groundwater may be exposed to higher levels of fluorides in their drinking water or in beverages prepared with the water. Among these populations, outdoor labourers, people living in hot climates, and people with excessive thirst will generally have the greatest daily intake of fluorides because they consume greater amounts of water.

Atmospheric Fate: Both hydrogen fluoride and particulate fluorides will be transported in the atmosphere and deposited on land or water by wet and dry deposition. Non-volatile inorganic fluoride particulates are removed from the atmosphere via condensation or nucleation processes. Fluorides adsorbed on particulate matter in the atmosphere are generally stable and are not readily hydrolyzed, although they may be degraded by radiation if they persist in the atmosphere. Fluorine and the silicon fluorides (fluosilicates, silicofluorides) are hydrolyzed in the atmosphere to form hydrogen fluoride. Hydrogen fluoride may combine with water vapour to produce an aerosol or fog of aqueous hydrofluoric acid. Inorganic fluoride compounds, with the exception of sulfur hexafluoride, are not expected to remain in the troposphere for long periods or to migrate to the stratosphere. Estimates of the residence time of sulfur hexafluoride in the atmosphere range from 500 to several thousand years. Fluoride in aerosols can be transported over large distances by wind or as a result of atmospheric turbulence. Fluorosilicic acid and hydrofluoric acid in high aquatic concentrations such as may be found in industrial waste ponds may volatilize, releasing silicon tetrafluoride and hydrogen fluoride into the atmosphere. Soluble inorganic fluorides may also form aerosols at the air/water interface or vaporize into the atmosphere whereas undissolved species generally undergo sedimentation.

Terrestrial Fate: Soils - Atmospheric fluorides may be transported to soils and surface waters through both wet and dry deposition processes where they may form complexes and bind strongly to soil and sediment. Solubilisation of inorganic fluorides from minerals may also be enhanced by the presence of bentonite clays and humic acid. Factors that influence the mobility of inorganic fluorides in soil are pH and the formation of aluminium and calcium complexes. In more acidic soils, concentrations of inorganic fluoride were considerably higher in the deeper horizons. The low affinity of fluorides for organic material results in leaching from the more acidic surface horizon and increased retention by clay minerals and silts in the more alkaline, deeper horizons. The maximum adsorption of fluoride to soil was reported to occur at pH 5.5. In acidic soils with pH below 6, most of the fluoride is in complexes with either aluminium or iron. Fluoride in alkaline soils at pH 6.5 and above is almost completely fixed in soils as calcium fluoride, if sufficient calcium carbonate is available. Fluoride is extremely immobile in soil.

Aquatic Fate: Fresh Water: - In water, the transport and transformation of inorganic fluorides are influenced by pH, water hardness and the presence of ion-exchange materials such as clays. In natural water, fluoride forms strong complexes with aluminium in water, and fluorine chemistry in water is largely regulated by aluminium concentration and pH. Below pH 5, fluoride is almost entirely complexed with aluminium and consequently, the concentration of free F⁻ is low. Once dissolved, inorganic fluorides remain in solution under conditions of low pH and hardness and in the presence of ion-exchange material. Sea Water - Fluoride forms stable complexes with calcium and magnesium, which are present in sea water. Calcium carbonate precipitation dominates the removal of dissolved fluoride from sea water. The residence time for fluoride in ocean sediment is calculated to be 2-3 million years.

Ecotoxicity: Fluorides have been shown to accumulate in animals that consume fluoride-containing foliage. However, accumulation is primarily in skeletal tissue and therefore, it is unlikely that fluoride will biomagnify up the food chain.

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

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
ammonium phosphate, monobasic	HIGH	HIGH
ammonium metavanadate	HIGH	HIGH
oxalic acid	LOW	LOW
sodium chloride	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
ammonium molybdate	LOW (BCF = 5.7)
ammonium phosphate, monobasic	LOW (LogKOW = -0.7699)
ammonium metavanadate	LOW (LogKOW = 2.229)
oxalic acid	LOW (LogKOW = -1.7365)
sodium chloride	LOW (LogKOW = 0.5392)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
ammonium phosphate, monobasic	HIGH (KOC = 1)
ammonium metavanadate	LOW (KOC = 35.04)
oxalic acid	HIGH (KOC = 1.895)
sodium chloride	LOW (KOC = 14.3)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS**Waste treatment methods**


Product / Packaging disposal	
	<ul style="list-style-type: none"> Recycle wherever possible. Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material). Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are

Certified Reference Material - Sea Water

▶ cleaned and destroyed.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO

Land transport (DOT)

UN number	3264				
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s.				
Transport hazard class(es)	<table border="1"> <tr> <td>Class</td> <td>8</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	8	Subrisk	Not Applicable
Class	8				
Subrisk	Not Applicable				
Packing group	II				
Environmental hazard	Not Applicable				
Special precautions for user	<table border="1"> <tr> <td>Hazard Label</td> <td>8</td> </tr> <tr> <td>Special provisions</td> <td>386, B2, IB2, T11, TP2, TP27</td> </tr> </table>	Hazard Label	8	Special provisions	386, B2, IB2, T11, TP2, TP27
Hazard Label	8				
Special provisions	386, B2, IB2, T11, TP2, TP27				

Air transport (ICAO-IATA / DGR)

UN number	3264														
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.														
Transport hazard class(es)	<table border="1"> <tr> <td>ICAO/IATA Class</td> <td>8</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>8L</td> </tr> </table>	ICAO/IATA Class	8	ICAO / IATA Subrisk	Not Applicable	ERG Code	8L								
ICAO/IATA Class	8														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	8L														
Packing group	II														
Environmental hazard	Not Applicable														
Special precautions for user	<table border="1"> <tr> <td>Special provisions</td> <td>A3A803</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>855</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>30 L</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>851</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>1 L</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Y840</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>0.5 L</td> </tr> </table>	Special provisions	A3A803	Cargo Only Packing Instructions	855	Cargo Only Maximum Qty / Pack	30 L	Passenger and Cargo Packing Instructions	851	Passenger and Cargo Maximum Qty / Pack	1 L	Passenger and Cargo Limited Quantity Packing Instructions	Y840	Passenger and Cargo Limited Maximum Qty / Pack	0.5 L
Special provisions	A3A803														
Cargo Only Packing Instructions	855														
Cargo Only Maximum Qty / Pack	30 L														
Passenger and Cargo Packing Instructions	851														
Passenger and Cargo Maximum Qty / Pack	1 L														
Passenger and Cargo Limited Quantity Packing Instructions	Y840														
Passenger and Cargo Limited Maximum Qty / Pack	0.5 L														

Sea transport (IMDG-Code / GGVSee)

UN number	3264						
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. *						
Transport hazard class(es)	<table border="1"> <tr> <td>IMDG Class</td> <td>8</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>	IMDG Class	8	IMDG Subrisk	Not Applicable		
IMDG Class	8						
IMDG Subrisk	Not Applicable						
Packing group	II						
Environmental hazard	Not Applicable						
Special precautions for user	<table border="1"> <tr> <td>EMS Number</td> <td>F-A, S-B</td> </tr> <tr> <td>Special provisions</td> <td>274</td> </tr> <tr> <td>Limited Quantities</td> <td>1 L</td> </tr> </table>	EMS Number	F-A, S-B	Special provisions	274	Limited Quantities	1 L
EMS Number	F-A, S-B						
Special provisions	274						
Limited Quantities	1 L						

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

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture**ALUMINIUM(7429-90-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Permissible exposure limits of air contaminants
US - Hawaii Air Contaminant Limits	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Massachusetts - Right To Know Listed Chemicals	US ACGIH Threshold Limit Values (TLV)
US - Michigan Exposure Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Minnesota Permissible Exposure Limits (PELs)	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Oregon Permissible Exposure Limits (Z-1)	US EPCRA Section 313 Chemical List
US - Pennsylvania - Hazardous Substance List	US NIOSH Recommended Exposure Limits (RELs)
US - Rhode Island Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	

ARSENIC(7440-38-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Washington Permissible exposure limits of air contaminants
US - Alaska Limits for Air Contaminants	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELEs)	US ACGIH Threshold Limit Values (TLV)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELEs)	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - California Permissible Exposure Limits for Chemical Contaminants	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Hawaii Air Contaminant Limits	US Clean Air Act - Hazardous Air Pollutants
US - Idaho - Limits for Air Contaminants	US CWA (Clean Water Act) - Priority Pollutants
US - Massachusetts - Right To Know Listed Chemicals	US CWA (Clean Water Act) - Toxic Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens	US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens
US - Pennsylvania - Hazardous Substance List	US NIOSH Recommended Exposure Limits (RELs)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	

BARIUM(7440-39-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US - Washington Permissible exposure limits of air contaminants
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Massachusetts - Right To Know Listed Chemicals	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Minnesota Permissible Exposure Limits (PELs)	US EPA Carcinogens Listing
US - Pennsylvania - Hazardous Substance List	US EPCRA Section 313 Chemical List
US - Rhode Island Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	

BORON(7440-42-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELEs)	US - Washington Permissible exposure limits of air contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Michigan Exposure Limits for Air Contaminants	US EPA Carcinogens Listing
US - Oregon Permissible Exposure Limits (Z-1)	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

CADMIUM(7440-43-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

US - Alaska Limits for Air Contaminants

US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity

US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)

US - California Permissible Exposure Limits for Chemical Contaminants

US - California Proposition 65 - Carcinogens

US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity

US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens

US - California Proposition 65 - Reproductive Toxicity

US - Hawaii Air Contaminant Limits

US - Idaho - Acceptable Maximum Peak Concentrations

US - Idaho - Limits for Air Contaminants

US - Massachusetts - Right To Know Listed Chemicals

US - Michigan Exposure Limits for Air Contaminants

US - Minnesota Permissible Exposure Limits (PELs)

US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens

US - Oregon Permissible Exposure Limits (Z-1)

US - Oregon Permissible Exposure Limits (Z-2)

US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

CALCIUM(7440-70-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals

US - Pennsylvania - Hazardous Substance List

CHROMIUM(7440-47-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

US - Alaska Limits for Air Contaminants

US - California Permissible Exposure Limits for Chemical Contaminants

US - Hawaii Air Contaminant Limits

US - Idaho - Limits for Air Contaminants

US - Massachusetts - Right To Know Listed Chemicals

US - Michigan Exposure Limits for Air Contaminants

US - Oregon Permissible Exposure Limits (Z-1)

US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

COPPER(7440-50-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants

US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)

US - California Permissible Exposure Limits for Chemical Contaminants

US - Hawaii Air Contaminant Limits

US - Idaho - Limits for Air Contaminants

US - Massachusetts - Right To Know Listed Chemicals

US - Michigan Exposure Limits for Air Contaminants

US - Minnesota Permissible Exposure Limits (PELs)

US - Oregon Permissible Exposure Limits (Z-1)

US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

GOLD(7440-57-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

IRON(7439-89-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)

US - California Permissible Exposure Limits for Chemical Contaminants

US - Hawaii Air Contaminant Limits

US - Michigan Exposure Limits for Air Contaminants

LEAD(7439-92-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants

US - Washington Permissible exposure limits of air contaminants

US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift

US ACGIH Threshold Limit Values (TLV)

US ACGIH Threshold Limit Values (TLV) - Carcinogens

US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)

US Clean Air Act - Hazardous Air Pollutants

US CWA (Clean Water Act) - Priority Pollutants

US CWA (Clean Water Act) - Toxic Pollutants

US EPA Carcinogens Listing

US EPCRA Section 313 Chemical List

US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Carcinogens Listing

US OSHA Permissible Exposure Levels (PELs) - Table Z1

US OSHA Permissible Exposure Levels (PELs) - Table Z2

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Rhode Island Hazardous Substance List

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants

US - Washington Permissible exposure limits of air contaminants

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

US ACGIH Threshold Limit Values (TLV)

US ACGIH Threshold Limit Values (TLV) - Carcinogens

US Clean Air Act - Hazardous Air Pollutants

US CWA (Clean Water Act) - Priority Pollutants

US CWA (Clean Water Act) - Toxic Pollutants

US EPCRA Section 313 Chemical List

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Levels (PELs) - Table Z1

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants

US - Washington Permissible exposure limits of air contaminants

US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

US ACGIH Threshold Limit Values (TLV)

US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)

US CWA (Clean Water Act) - Priority Pollutants

US CWA (Clean Water Act) - Toxic Pollutants

US EPA Carcinogens Listing

US EPCRA Section 313 Chemical List

US NIOSH Recommended Exposure Limits (RELs)

US OSHA Permissible Exposure Levels (PELs) - Table Z1

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Oregon Permissible Exposure Limits (Z-1)

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Washington Permissible exposure limits of air contaminants

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - Alaska Limits for Air Contaminants
 US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - California Proposition 65 - Carcinogens
 US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
 US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
 US - California Proposition 65 - Reproductive Toxicity
 US - Hawaii Air Contaminant Limits
 US - Idaho - Acceptable Maximum Peak Concentrations
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Minnesota Permissible Exposure Limits (PELs)
 US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
 US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List

LITHIUM(7439-93-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
 US - Massachusetts - Right To Know Listed Chemicals
 US - Pennsylvania - Hazardous Substance List

MAGNESIUM(7439-95-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Oregon Permissible Exposure Limits (Z-1)

MANGANESE(II) ACETATE TETRAHYDRATE(6156-78-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

MERCURY (ELEMENTAL)(7439-97-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - California Proposition 65 - Reproductive Toxicity
 US - Hawaii Air Contaminant Limits
 US - Idaho - Acceptable Maximum Peak Concentrations
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Oregon Permissible Exposure Limits (Z-2)
 US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants

AMMONIUM MOLYBDATE(13106-76-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US Clean Air Act - Hazardous Air Pollutants
 US CWA (Clean Water Act) - Priority Pollutants
 US CWA (Clean Water Act) - Toxic Pollutants
 US EPA Carcinogens Listing
 US EPCRA Section 313 Chemical List
 US National Toxicology Program (NTP) 14th Report Part B.
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Rhode Island Hazardous Substance List
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US Clean Air Act - Hazardous Air Pollutants
 US EPCRA Section 313 Chemical List
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Washington Permissible exposure limits of air contaminants
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
 US Clean Air Act - Hazardous Air Pollutants
 US CWA (Clean Water Act) - Priority Pollutants
 US CWA (Clean Water Act) - Toxic Pollutants
 US EPA Carcinogens Listing
 US EPCRA Section 313 Chemical List
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US OSHA Permissible Exposure Levels (PELs) - Table Z2
 US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
 US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

US - Alaska Limits for Air Contaminants
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NICKEL(7440-02-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - California Proposition 65 - Carcinogens
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
 US Clean Air Act - Hazardous Air Pollutants
 US CWA (Clean Water Act) - Priority Pollutants
 US CWA (Clean Water Act) - Toxic Pollutants
 US EPCRA Section 313 Chemical List
 US National Toxicology Program (NTP) 14th Report Part B.
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AMMONIUM PHOSPHATE, MONOBASIC(7722-76-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

POTASSIUM(7440-09-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
 US - Massachusetts - Right To Know Listed Chemicals
 US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

RUBIDIUM(7440-17-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

SCANDIUM(7440-20-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Michigan Exposure Limits for Air Contaminants

US - Oregon Permissible Exposure Limits (Z-1)
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

SELENIUM(7782-49-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants

US - Washington Permissible exposure limits of air contaminants
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
 US ACGIH Threshold Limit Values (TLV)
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
 US Clean Air Act - Hazardous Air Pollutants
 US CWA (Clean Water Act) - Priority Pollutants
 US CWA (Clean Water Act) - Toxic Pollutants
 US EPA Carcinogens Listing
 US EPCRA Section 313 Chemical List
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AMMONIUM FLUOSILICATE(16919-19-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Oregon Permissible Exposure Limits (Z-2)
 US - Pennsylvania - Hazardous Substance List

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
 US CWA (Clean Water Act) - List of Hazardous Substances
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US OSHA Permissible Exposure Levels (PELs) - Table Z2
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

SILVER(7440-22-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Pennsylvania - Hazardous Substance List
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US ACGIH Threshold Limit Values (TLV)
 US CWA (Clean Water Act) - Priority Pollutants
 US CWA (Clean Water Act) - Toxic Pollutants
 US EPA Carcinogens Listing
 US EPCRA Section 313 Chemical List
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

SODIUM(7440-23-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
 US - Massachusetts - Right To Know Listed Chemicals
 US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List
 US CWA (Clean Water Act) - List of Hazardous Substances
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

STRONTIUM(7440-24-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

SULFURIC ACID(7664-93-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft
 US - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Rhode Island Hazardous Substance List
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US CWA (Clean Water Act) - List of Hazardous Substances
 US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals
 US EPCRA Section 313 Chemical List
 US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US SARA Section 302 Extremely Hazardous Substances
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

URANIUM MIXED OXIDES (U3O8)(1344-59-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Limits for Air Contaminants
 US - Massachusetts - Right To Know Listed Chemicals
 US - Michigan Exposure Limits for Air Contaminants
 US - Minnesota Permissible Exposure Limits (PELs)
 US - Oregon Permissible Exposure Limits (Z-1)
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
 US - Washington Permissible exposure limits of air contaminants
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AMMONIUM METAVANADATE(7803-55-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
 US - Massachusetts - Right To Know Listed Chemicals
 US - Pennsylvania - Hazardous Substance List

US EPCRA Section 313 Chemical List
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

ZINC(7440-66-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Washington Permissible exposure limits of air contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Massachusetts - Right To Know Listed Chemicals	US CWA (Clean Water Act) - Priority Pollutants
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - Toxic Pollutants
US - Oregon Permissible Exposure Limits (Z-1)	US EPA Carcinogens Listing
US - Pennsylvania - Hazardous Substance List	US EPCRA Section 313 Chemical List
US - Rhode Island Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AMMONIUM BROMIDE(12124-97-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals	US - Rhode Island Hazardous Substance List
US - Pennsylvania - Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

OXALIC ACID(144-62-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Idaho - Limits for Air Contaminants	US - Washington Permissible exposure limits of air contaminants
US - Massachusetts - Right To Know Listed Chemicals	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Minnesota Permissible Exposure Limits (PELs)	US NIOSH Recommended Exposure Limits (RELs)
US - Oregon Permissible Exposure Limits (Z-1)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Pennsylvania - Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Rhode Island Hazardous Substance List	

SODIUM CHLORIDE(7647-14-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

AMMONIUM IODIDE(12027-06-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

NITRIC ACID(7697-37-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)	US - Washington Permissible exposure limits of air contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Hawaii Air Contaminant Limits	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Massachusetts - Right To Know Listed Chemicals	US CWA (Clean Water Act) - List of Hazardous Substances
US - Michigan Exposure Limits for Air Contaminants	US EPCRA Section 313 Chemical List
US - Minnesota Permissible Exposure Limits (PELs)	US NIOSH Recommended Exposure Limits (RELs)
US - Oregon Permissible Exposure Limits (Z-1)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Pennsylvania - Hazardous Substance List	US SARA Section 302 Extremely Hazardous Substances
US - Rhode Island Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Pennsylvania - Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
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Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Immediate (acute) health hazard	Yes
Delayed (chronic) health hazard	No
Fire hazard	No
Pressure hazard	No
Reactivity hazard	No

US EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
Arsenic	1	0.454
Cadmium	10	4.54
Chromium	5000	2270
Copper	5000	2270
Lead	10	4.54
Mercury	1	0.454
Nickel	100	45.4
Selenium	100	45.4

Ammonium silicofluoride	1000	454
Silver	1000	454
Sodium	10	4.54
Sulfuric acid	1000	454
Ammonium vanadate	1000	454
Zinc	1000	454
Nitric acid	1000	454

State Regulations

US. CALIFORNIA PROPOSITION 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm

US - CALIFORNIA PREPOSITION 65 - CARCINOGENS & REPRODUCTIVE TOXICITY (CRT): LISTED SUBSTANCE

Cadmium and cadmium compounds: Cadmium, Lead and lead compounds: Lead, Mercury and mercury compounds, Nickel (Metallic) Listed

National Inventory	Status
Australia - AICS	Y
Canada - DSL	N (rubidium; uranium mixed oxides (U3O8); scandium)
Canada - NDSL	N (sodium; strontium; lead; calcium; ammonium molybdate; zinc; potassium; ammonium metavanadate; ammonium bromide; magnesium; copper; boron; lithium; ammonium phosphate, monobasic; water; barium; selenium; ammonium fluorosilicate; ammonium iodide; oxalic acid; aluminium; gold; mercury (elemental); arsenic; nickel; manganese(II) acetate tetrahydrate; sulfuric acid; iron; sodium chloride; chromium; silver; cadmium; nitric acid)
China - IECSC	N (rubidium; uranium mixed oxides (U3O8))
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (sodium; strontium; calcium; ammonium molybdate; zinc; potassium; magnesium; copper; boron; lithium; ammonium phosphate, monobasic; water; barium; selenium; ammonium fluorosilicate; ammonium iodide; oxalic acid; aluminium; gold; mercury (elemental); arsenic; nickel; manganese(II) acetate tetrahydrate; iron; sodium chloride; chromium; silver; rubidium; uranium mixed oxides (U3O8); cadmium; scandium; nitric acid)
Korea - KECI	N (uranium mixed oxides (U3O8))
New Zealand - NZIoC	N (uranium mixed oxides (U3O8); scandium)
Philippines - PICCS	N (uranium mixed oxides (U3O8); scandium)
USA - TSCA	Y
Legend:	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
aluminium	7429-90-5, 91728-14-2
calcium	7440-70-2, 8047-59-4
copper	7440-50-8, 133353-46-5, 133353-47-6, 195161-80-9, 65555-90-0, 72514-83-1
ammonium molybdate	13106-76-8, 12054-85-2, 140899-16-7
ammonium fluorosilicate	16919-19-0, 1309-32-6
sodium chloride	7647-14-5, 14762-51-7, 16887-00-6

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
 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

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Certified Reference Material - Sea Water

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