



Initial Check Verification Standard 1

High-Purity Standards

Catalogue number: ICV-1 Solution A
Version No: 2.2
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 04/28/2017
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S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Initial Check Verification Standard 1
Synonyms	Not Available
Proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. (contains nitric acid)
Other means of identification	ICV-1 Solution A

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	Serious Eye Damage Category 1, Acute Toxicity (Oral) Category 4, Acute Toxicity (Dermal) Category 3, 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)

H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Continued...

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) Prevention

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
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Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
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Precautionary statement(s) Storage

P405	Store locked up.
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Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**Substances**

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7429-90-5	0.01	<u>aluminium</u>
7440-38-2	0.01	<u>arsenic</u>
513-77-9	0.005	<u>barium carbonate</u>
19049-40-2	0.005	<u>beryllium acetate, basic</u>
10043-35-3	0.01	<u>boric acid</u>
471-34-1	0.01	<u>calcium carbonate</u>
7440-43-9	0.005	<u>cadmium</u>
7440-47-3	0.005	<u>chromium</u>
7440-48-4	0.01	<u>cobalt</u>
7440-50-8	0.01	<u>copper</u>
7439-89-6	0.01	<u>iron</u>
7439-92-1	0.01	<u>lead</u>
7439-95-4	0.01	<u>magnesium</u>
7439-98-7	0.01	<u>molybdenum</u>
7440-02-0	0.01	<u>nickel</u>
7757-79-1	0.02	<u>potassium nitrate</u>
7782-49-2	0.02	<u>selenium</u>
10042-76-9	0.01	<u>strontium nitrate</u>
7440-28-0	0.01	<u>thallium</u>
7803-55-6	0.005	<u>ammonium metavanadate</u>
7440-66-6	0.005	<u>zinc</u>
7697-37-2	4	<u>nitric acid</u>
7664-39-3	0-0.49	<u>hydrofluoric acid</u>
7732-18-5	balance	<u>water</u>
7440-69-9	0.01	<u>bismuth</u>
7439-93-2	0.01	<u>lithium</u>
7722-76-1	0.02	<u>ammonium phosphate, monobasic</u>
6156-78-1	0.005	<u>manganese(II) acetate tetrahydrate</u>

SECTION 4 FIRST-AID MEASURES**Description of first aid measures**

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
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Skin Contact	<p>If there is evidence of severe skin irritation or skin burns:</p> <ul style="list-style-type: none"> ▶ Avoid further contact. Immediately remove contaminated clothing, including footwear. ▶ Flush skin under running water for 15 minutes. ▶ Avoiding contamination of the hands, massage calcium gluconate gel into affected areas, pay particular attention to creases in skin. ▶ Contact the Poisons Information Centre. ▶ Continue gel application for at least 15 minutes after burning sensation ceases. ▶ If pain recurs, repeat application of calcium gluconate gel or apply every 20 minutes. ▶ If no gel is available, continue washing for at least 15 minutes, using soap if available. If patient is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth. ▶ Transport to hospital, or doctor, urgently.
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> <p>For massive exposures:</p> <ul style="list-style-type: none"> ▶ If dusts, vapours, aerosols, 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. ▶ If victim is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth. ▶ Transport to hospital, or doctor, urgently.
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

Following acute or short term repeated exposure to hydrofluoric acid:

- ▶ Subcutaneous injections of Calcium Gluconate may be necessary around the burnt area. Continued application of Calcium Gluconate Gel or subcutaneous Calcium Gluconate should then continue for 3-4 days at a frequency of 4-6 times per day. If a "burning" sensation recurs, apply more frequently.
- ▶ Systemic effects of extensive hydrofluoric acid burns include renal damage, hypocalcaemia and consequent cardiac arrhythmias. Monitor haematological, respiratory, renal, cardiac and electrolyte status at least daily. Tests should include FBE, blood gases, chest X-ray, creatinine and electrolytes, urine output, Ca ions, Mg ions and phosphate ions. Continuous ECG monitoring may be required.
- ▶ Where serum calcium is low, or clinical, or ECG signs of hypocalcaemia develop, infusions of calcium gluconate, or if less serious, oral Sandocal, should be given. Hydrocortisone 500 mg in a four to six hourly infusion may help.
- ▶ Antibiotics should not be given as a routine, but only when indicated.
- ▶ Eye contact pain may be excruciating and 2-3 drops of 0.05% pentocaine hydrochloride may be instilled, followed by further irrigation

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Methaemoglobin in blood	1.5% of haemoglobin	During or end of shift	B, NS, SQ

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

NS: Non-specific determinant; Also seen after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

For acute or short term repeated exposures to fluorides:

- ▶ Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
- ▶ Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.
- ▶ Peak serum levels are reached 30 mins. post-exposure; 50% appears in the urine within 24 hours.
- ▶ For acute poisoning (endotracheal intubation if inadequate tidal volume), monitor breathing and evaluate/monitor blood pressure and pulse frequently since shock may supervene with little warning. Monitor ECG immediately; watch for arrhythmias and evidence of Q-T prolongation or T-wave changes. Maintain monitor. Treat shock vigorously with isotonic saline (in 5% glucose) to restore blood volume and enhance renal excretion.
- ▶ Where evidence of hypocalcaemic or normocalcaemic tetany exists, calcium gluconate (10 ml of a 10% solution) is injected to avoid tachycardia.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Fluorides in urine	3 mg/gm creatinine	Prior to shift	B, NS

Continued...

10mg/gm creatinine

End of shift

B, NS

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

NS: Non-specific determinant; also observed after exposure to other exposures.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

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	<ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Use fire fighting procedures suitable for surrounding area. ▶ Do not approach containers suspected to be hot. ▶ Cool fire exposed containers with water spray from a protected location. ▶ If safe to do so, remove containers from path of fire. ▶ Equipment should be thoroughly decontaminated after use.
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> <p>May emit corrosive fumes.</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	<ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Consider evacuation (or protect in place). ▶ Stop leak if safe to do so. ▶ Contain spill with sand, earth or vermiculite. ▶ Collect recoverable product into labelled containers for recycling. ▶ Neutralise/decontaminate residue (see Section 13 for specific agent). ▶ Collect solid residues and seal in labelled drums for disposal. ▶ Wash area and prevent runoff into drains. ▶ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▶ If contamination of drains or waterways occurs, advise emergency services.

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.
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	<ul style="list-style-type: none"> ▶ 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 ▶ 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> <ul style="list-style-type: none"> ▶ Material is corrosive to most metals, glass and other siliceous materials.
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> <ul style="list-style-type: none"> ▶ 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. ▶ WARNING: Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. ▶ The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive. ▶ Avoid reaction with borohydrides or cyanoborohydrides <p>Salts of inorganic fluoride:</p> <ul style="list-style-type: none"> ▶ react with water forming acidic solutions. ▶ are violent reactive with boron, bromine pentafluoride, bromine trifluoride, calcium disilicide, calcium hydride, oxygen difluoride, platinum, potassium. ▶ in aqueous solutions are incompatible with sulfuric acid, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, isocyanates, nitromethane, organic anhydrides, vinyl acetate. ▶ corrode metals in presence of moisture ▶ may be incompatible with glass and porcelain ▶ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. <p>Hydrogen fluoride:</p> <ul style="list-style-type: none"> ▶ reacts violently with strong oxidisers, acetic anhydride, alkalis, 2-aminoethanol, arsenic trioxide (with generation of heat), bismuthic acid, calcium oxide, chlorosulfonic acid, cyanogen fluoride, ethylenediamine, ethyleneimine, fluorine (fluorine gas reacts vigorously with a 50% hydrofluoric acid solution and may burst into flame), nitrogen trifluoride, N-phenylazopiperidine, oleum, oxygen difluoride, phosphorus pentoxide, potassium permanganate, potassium tetrafluorosilicate(2-), beta-propiolactone, propylene oxide, sodium, sodium tetrafluorosilicate, sulfuric acid, vinyl acetate ▶ reacts (possibly violently) with aliphatic amines, alcohols, alkanolamines, alkylene oxides, aromatic amines, amides, ammonia, ammonium hydroxide, epichlorohydrin, isocyanates, metal acetylides, metal silicides, methanesulfonic acid, nitrogen compounds, organic anhydrides, oxides, silicon compounds, vinylidene fluoride ▶ attacks glass and siliceous materials, concrete, ceramics, metals (flammable hydrogen gas may be produced), metal alloys, some plastics, rubber coatings, leather, and most other materials with the exception of lead, platinum, polyethylene, wax. ▶ 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	beryllium acetate, basic	Silicates - Mica / Silicates - Soapstone / Silicates-Soapstone / Silicates - Talc / Silicates - Tremolite, asbestiform	0.1 mg/m ³	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	beryllium acetate, basic	Beryllium and beryllium compounds / Zirconium compounds	5 mg/m ³	Not Available	Not Available	See Table Z-2;(as Be) / (as Zr)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	beryllium acetate, basic	Beryllium and beryllium compounds	0.002 mg/m ³	Not Available	0.005 mg/m ³	(Z37.29–1970)
US OSHA Permissible Exposure Levels (PELs) - Table Z3	beryllium acetate, basic	Silicates: Mica / Silicates: Soapstone / Silicates: Talc / Silicates: Tremolite, asbestiforms	0.1 f/cc / 20 mppcf	Not Available	Not Available	(less than 1% crystalline silica) / (containing asbestos) Use asbestos limit;(less than 1% crystalline silica) / (see 29 CFR 1910.1001);(less than 1% crystalline silica)
US ACGIH Threshold Limit Values (TLV)	beryllium acetate, basic	Beryllium and compounds, as Be / Beryllium and compounds, as Be - Soluble and insoluble compounds	0.00005 mg/m ³	Not Available	Not Available	TLV® Basis: Beryllium sens; chronic beryllium disease (berylliosis)
US ACGIH Threshold Limit Values (TLV)	boric acid	Borate compounds, inorganic	2 mg/m ³	6 mg/m ³	Not Available	TLV® Basis: URT irr
US OSHA Permissible Exposure Levels (PELs) - Table Z1	calcium carbonate	Calcium carbonate / Calcium carbonate - Respirable fraction	15 mg/m ³ / 5 mg/m ³	Not Available	Not Available	Total dust
US NIOSH Recommended Exposure Limits (RELs)	calcium carbonate	Calcium carbonate, Natural calcium carbonate [Note: Calcite & aragonite are commercially important natural calcium carbonates.] / Calcium carbonate, Natural calcium carbonate [Note: Marble is a metamorphic form of calcium carbonate.]	10 (total), 5 (resp) mg/m ³	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	calcium carbonate	Calcium salt of carbonic acid [Note: Occurs in nature as as limestone, chalk, marble, dolomite, aragonite, calcite and oyster shells.]	10 (total), 5 (resp) mg/m ³	Not Available	Not Available	Not Available
US OSHA Permissible Exposure Levels (PELs) - Table Z1	cadmium	Cadmium	0.005 mg/m ³	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/m ³ / 0.2 mg/m ³	Not Available	0.3 mg/m ³ / 0.6 mg/m ³	(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/m ³	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	cobalt	Cobalt metal, dust, and fume	0.1 mg/m3	Not Available	Not Available	(as Co)
US ACGIH Threshold Limit Values (TLV)	cobalt	Hard metals containing Cobalt and Tungsten carbide, as Co	0.005 mg/m3	Not Available	Not Available	TLV® Basis: Pneumonitis
US NIOSH Recommended Exposure Limits (RELS)	cobalt	Cobalt metal dust, Cobalt metal fume	0.05 mg/m3	Not Available	Not Available	Not Available
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 Z3	iron	Inert or Nuisance Dust	5 mg/m3 / 15 mg/m3 / 15 mppcf / 50 mppcf	Not Available	Not Available	Respirable fraction;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. / Total dust;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.
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 Z3	magnesium	Inert or Nuisance Dust	5 mg/m3 / 15 mg/m3 / 15 mppcf / 50 mppcf	Not Available	Not Available	Respirable fraction;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. / Total dust;All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.
US OSHA Permissible Exposure Levels (PELs) - Table Z1	molybdenum	Molybdenum - Insoluble compounds	15 mg/m3	Not Available	Not Available	Total dust; (as Mo)
US ACGIH Threshold Limit Values (TLV)	molybdenum	Molybdenum, as Mo	0.5 mg/m3	Not Available	Not Available	TLV® Basis: LRT irr
US NIOSH Recommended Exposure Limits (RELS)	molybdenum	Molybdenum metal	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 ACGIH Threshold Limit Values (TLV)	thallium	Thallium and compounds, as TI	0.02 mg/m3	Not Available	Not Available	TLV® Basis: GI dam; peripheral neuropathy
US OSHA Permissible Exposure Levels (PELs) - Table Z3	zinc	Inert or Nuisance Dust	5 mg/m3 / 15 mg/m3 / 15 mppcf / 50 mppcf	Not Available	Not Available	Respirable fraction; All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1. / Total dust; All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.
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
US OSHA Permissible Exposure Levels (PELs) - Table Z1	hydrofluoric acid	Hydrogen fluoride	Not Available	Not Available	Not Available	See Table Z-2; (as F)
US OSHA Permissible Exposure Levels (PELs) - Table Z2	hydrofluoric acid	Hydrogen fluoride	3 ppm	Not Available	Not Available	(Z37.28-1969)
US ACGIH Threshold Limit Values (TLV)	hydrofluoric acid	Hydrogen fluoride, as F	0.5 ppm	Not Available	2 ppm	TLV® Basis: URT, LRT, skin, & eye irr; fluorosis; BEI
US NIOSH Recommended Exposure Limits (RELs)	hydrofluoric acid	Anhydrous hydrogen fluoride; Aqueous hydrogen fluoride (i.e., Hydrofluoric acid); HF-A	2.5 mg/m3 / / 3 ppm	Not Available	5 mg/m3 / 6 ppm	[15-minute]
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)

EMERGENCY LIMITS


Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
barium carbonate	Barium carbonate	2.2 mg/m3	270 mg/m3	1,600 mg/m3
boric acid	Boric acid	6 mg/m3	23 mg/m3	830 mg/m3
calcium carbonate	Limestone; (Calcium carbonate; Dolomite)	45 mg/m3	500 mg/m3	3,000 mg/m3
calcium carbonate	Carbonic acid, calcium salt	45 mg/m3	210 mg/m3	1,300 mg/m3
cadmium	Cadmium	Not Available	Not Available	Not Available
chromium	Chromium	1.5 mg/m3	17 mg/m3	99 mg/m3
cobalt	Cobalt	0.18 mg/m3	2 mg/m3	20 mg/m3
copper	Copper	3 mg/m3	33 mg/m3	200 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
magnesium	Magnesium	18 mg/m3	200 mg/m3	1,200 mg/m3
molybdenum	Molybdenum	30 mg/m3	330 mg/m3	2,000 mg/m3
nickel	Nickel	4.5 mg/m3	50 mg/m3	99 mg/m3
potassium nitrate	Potassium nitrate	9 mg/m3	100 mg/m3	600 mg/m3
selenium	Selenium	0.6 mg/m3	6.6 mg/m3	40 mg/m3
strontium nitrate	Strontium nitrate	5.7 mg/m3	62 mg/m3	370 mg/m3
thallium	Thallium	0.06 mg/m3	13 mg/m3	20 mg/m3
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
nitric acid	Nitric acid	Not Available	Not Available	Not Available
hydrofluoric acid	Hydrogen fluoride; (Hydrofluoric acid)	Not Available	Not Available	Not Available
bismuth	Bismuth	15 mg/m3	170 mg/m3	990 mg/m3
lithium	Lithium	3.3 mg/m3	36 mg/m3	220 mg/m3
ammonium phosphate, monobasic	Ammonium dihydrogen phosphate; (Monoammonium phosphate)	17 mg/m3	190 mg/m3	1,100 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
Ingredient	Original IDLH	Revised IDLH		
aluminium	Not Available	Not Available		
arsenic	100 mg/m3	5 mg/m3		
barium carbonate	Not Available	Not Available		
beryllium acetate, basic	10 mg/m3	4 mg/m3		
boric acid	Not Available	Not Available		
calcium carbonate	Not Available	Not Available		
cadmium	50 mg/m3 / 9 mg/m3	9 mg/m3 / 9 [Unch] mg/m3		
chromium	N.E. / N.E.	250 mg/m3		
cobalt	20 mg/m3	20 [Unch] mg/m3		
copper	N.E. / N.E.	100 mg/m3		
iron	Not Available	Not Available		
lead	700 mg/m3	100 mg/m3		
magnesium	Not Available	Not Available		
molybdenum	N.E. / N.E.	5,000 mg/m3		
nickel	N.E. / N.E.	10 mg/m3		
potassium nitrate	Not Available	Not Available		
selenium	Unknown mg/m3 / Unknown ppm	1 mg/m3		
strontium nitrate	Not Available	Not Available		
thallium	Not Available	Not Available		
ammonium metavanadate	Not Available	Not Available		
zinc	Not Available	Not Available		
nitric acid	100 ppm	25 ppm		
hydrofluoric acid	30 ppm	30 [Unch] ppm		
water	Not Available	Not Available		
bismuth	Not Available	Not Available		
lithium	Not Available	Not Available		
ammonium phosphate, monobasic	Not Available	Not Available		
manganese(II) acetate tetrahydrate	N.E. / N.E.	500 mg/m3		

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. 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>	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.)
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Initial Check Verification Standard 1

	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.
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 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)	< 2	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 ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7

Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful. 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>Bronchial and alveolar exudate are apparent in animals exposed to molybdenum by inhalation. Molybdenum fume may produce bronchial irritation and moderate fatty changes in liver and kidney.</p> <p>Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort. A single acute over-exposure may even cause nose bleed.</p> <p>Acute inhalation of hydrogen fluoride (hydrofluoric acid) vapours causes severe irritation of the eye, nose and throat, delayed fever, bluing of the extremities and water in the lungs, and may cause death. The above irritation occurs even with fairly low concentrations of hydrogen fluoride. Hydrogen fluoride has a strong irritating odour, that can be detected at concentrations of about 0.04 parts per million. Higher levels cause corrosion of the throat, nose and lungs, leading to severe inflammation and water buildup in the lungs (which may occur with 1 hour of exposure). A vapour concentration of 10 parts per million is regarded as intolerable, but a vapour concentration of 30 parts per million is considered as immediately dangerous to life and health.</p> <p>It is estimated that the lowest lethal concentration for a 5-minute human exposure to hydrogen fluoride is in the range of 50 to 250 parts per million. Exposure by either skin contact or inhalation may lead to low levels of calcium and magnesium in the blood, which may result in heart rhythm disturbances. Animal testing suggests that repeated exposure produces liver and kidney damage.</p>
Ingestion	<p>Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>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>Molybdenum, an essential trace element, can in large doses hamper growth and cause loss of appetite, listlessness and diarrhoea. Anaemia also occurs, and other symptoms include greying of hair, shrinking of the testicles, reduced fertility and milk production, shortness of breath, incoordination and irritation of the mucous membranes.</p> <p>Fluoride causes severe loss of calcium in the blood, with symptoms appearing several hours later including painful and rigid muscle contractions of the limbs. Cardiovascular collapse can occur and may cause death with increased heart rate and other heart rhythm irregularities.</p> <p>Ingestion or skin absorption of boric acid causes nausea, abdominal pain, diarrhoea and profuse vomiting which may be blood stained, headache, weakness, reddened lesions on the skin. In severe cases, it may cause shock, with fall in blood pressure, increase in heart rate, blue skin colour, brain and nervous irritation, reduced urine volume or even absence of urine.</p> <p>Borate poisoning causes nausea, vomiting, diarrhoea and pain in the upper abdomen. Often persistent vomiting occurs, and there may be blood in the faeces.</p>
Skin Contact	<p>Skin contact with the material may be harmful; systemic effects may result following absorption.</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>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. Contact of the skin with liquid hydrofluoric acid (hydrogen fluoride) may cause severe burns, erythema, and swelling, vesiculation, and serious crusting. With more serious burns, ulceration, blue-gray discoloration, and necrosis may occur. Solutions of hydrofluoric acid, as dilute as 2%, may cause severe skin burns.</p> <p>Boric acid is not absorbed via intact skin but absorbed on broken or inflamed skin.</p> <p>Fluorides are easily absorbed through the skin and cause death of soft tissue and erode bone. Healing is delayed and death of tissue may continue to spread beneath skin.</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> <p>Animal testing showed that a 20% solution of hydrofluoric acid (hydrogen fluoride) in water caused immediate damage in the form of total clouding of the lens and ischaemia of the conjunctiva. Swelling of the stroma of the cornea occurred within 1 hour, followed by tissue death (necrosis) of structures of the front of the eye.</p>
Chronic	<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> <p>High levels of molybdenum can cause joint problems in the hands and feet with pain and lameness. Molybdenum compounds can also cause liver changes with elevated levels of enzymes and cause over-activity of the thyroid gland.</p> <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p> <p>Chronic boric acid poisoning is characterized by mild gastrointestinal irritation, loss of appetite, disturbed digestion, nausea, possibly vomiting and a hard irregular and discoloured rash. Dryness of skin, reddening of tongue, loss of hair, inflammation of conjunctiva, and kidney injury have also been reported.</p> <p>Borate can accumulate in the testes and deplete germ cells and cause withering of the testicles, according to animal testing. Hair loss, skin inflammation, stomach ulcer and anaemia can all occur.</p> <p>Extended exposure to inorganic fluorides causes fluorosis, which includes signs of joint pain and stiffness, tooth discoloration, nausea and vomiting, loss of appetite, diarrhoea or constipation, weight loss, anaemia, weakness and general unwellness. There may also be frequent urination and thirst.</p> <p>Hydrogen fluoride easily penetrates the skin and causes destruction and corrosion of the bone and underlying tissue. Ingestion causes severe pains and burns in the mouth and throat and blood calcium levels are dangerously reduced.</p>

Initial Check Verification Standard 1	TOXICITY	IRRITATION
	Not Available	Not Available
aluminium	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available

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arsenic	TOXICITY	IRRITATION
	Oral (rat) LD50: 763 mg/kg ^[2]	Not Available
barium carbonate	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available
	Oral (rat) LD50: >100<300 mg/kg ^[1]	
beryllium acetate, basic	TOXICITY	IRRITATION
	Not Available	Not Available
boric acid	TOXICITY	IRRITATION
	Oral (rat) LD50: 2500 mg/kg ^[2]	Skin (human): 15 mg/3d -I- mild
calcium carbonate	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Eye (rabbit): 0.75 mg/24h - SEVERE
	Oral (rat) LD50: >2000 mg/kg ^[1]	Skin (rabbit): 500 mg/24h-moderate
cadmium	TOXICITY	IRRITATION
	Oral (rat) LD50: >63<259 mg/kg ^[1]	Not Available
chromium	TOXICITY	IRRITATION
	Not Available	Not Available
cobalt	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available
	Oral (rat) LD50: 6170 mg/kg ^[2]	
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]	
Oral (rat) LD50: 300-500 mg/kg ^[1]		
iron	TOXICITY	IRRITATION
	Oral (rat) LD50: 98600 mg/kg ^[2]	Not Available
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]		
magnesium	TOXICITY	IRRITATION
	Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
molybdenum	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg ^[1]	Not Available
	Oral (rat) LD50: >2000 mg/kg ^[1]	

Initial Check Verification Standard 1

nickel	TOXICITY	IRRITATION
	Oral (rat) LD50: 5000 mg/kg ^[2]	Not Available
potassium nitrate	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[1] Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
selenium	TOXICITY	IRRITATION
	Oral (rat) LD50: 6700 mg/kg ^[2]	Not Available
strontium nitrate	TOXICITY	IRRITATION
	Oral (rat) LD50: 1892 mg/kg ^[2]	Not Available
thallium	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
nitric acid	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 625 ppm/1h ^[2]	Not Available
hydrofluoric acid	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 1276 ppm/4hr ^[2] Inhalation (rat) LC50: 319 ppm/1hr ^[2]	Eye (human): 50 mg - SEVERE
water	TOXICITY	IRRITATION
	Not Available	Not Available
bismuth	TOXICITY	IRRITATION
	Oral (rat) LD50: 2000 mg/kg ^[1]	Not Available
lithium	TOXICITY	IRRITATION
	Not Available	Not Available
ammonium phosphate, monobasic	TOXICITY	IRRITATION
	dermal (rat) LD50: >5000 mg/kg ^[1] Oral (rat) LD50: >2000 mg/kg ^[1]	Not Available
manganese(II) acetate tetrahydrate	TOXICITY	IRRITATION
	Oral (rat) LD50: 3730 mg/kg ^[2]	Not Available

Legend:

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

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.

Continued...

	Tumorigenic - Carcinogenic by RTECS criteria.
CALCIUM CARBONATE	No evidence of carcinogenic properties. teratogenic effects.
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.
COBALT	Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved.
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.
LEAD	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.
NICKEL	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. Oral (rat) TDLo: 500 mg/kg/5D-1 Inhalation (rat) TCLo: 0.1 mg/m ³ /24H/17W-C
THALLIUM	Structural changes in nerves and sheath, changes in extraocular muscles, hair loss recorded
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 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]
HYDROFLUORIC ACID	(liver and kidney damage) [Manufacturer] for hydrogen fluoride (as vapour)
ALUMINIUM & BERYLLIUM ACETATE, BASIC & CHROMIUM & MOLYBDENUM & HYDROFLUORIC ACID & WATER & LITHIUM & AMMONIUM PHOSPHATE, MONOBASIC	No significant acute toxicological data identified in literature search.
ARSENIC & BERYLLIUM ACETATE, BASIC	WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.
BERYLLIUM ACETATE, BASIC & COBALT & NICKEL	The following information refers to contact allergens as a group and may not be specific to this product.
BERYLLIUM ACETATE, BASIC & CALCIUM CARBONATE & STRONTIUM NITRATE & AMMONIUM METAVANADATE & NITRIC ACID & HYDROFLUORIC ACID & LITHIUM & AMMONIUM PHOSPHATE, MONOBASIC & MANGANESE(II) ACETATE TETRAHYDRATE	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
BORIC ACID & CALCIUM CARBONATE & ZINC	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
CALCIUM CARBONATE & NITRIC ACID & HYDROFLUORIC ACID	The material may produce severe irritation to the eye causing pronounced inflammation.
CHROMIUM & SELENIUM	The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans.
COBALT & NICKEL	WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
NITRIC ACID & HYDROFLUORIC ACID	The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.
Acute Toxicity	✓
Skin Irritation/Corrosion	✓
Serious Eye Damage/Irritation	✓
Respiratory or Skin sensitisation	⊖
Mutagenicity	⊖
Carcinogenicity	⊖
Reproductivity	⊖
STOT - Single Exposure	⊖
STOT - Repeated Exposure	⊖
Aspiration Hazard	⊖

Legend: ✗ – Data 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

Initial Check Verification Standard 1	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

aluminium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.078-0.108mg/L	2
	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

arsenic	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	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

barium carbonate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	>3.5mg/L	2
	EC50	72	Algae or other aquatic plants	>1.15mg/L	2
	EC50	72	Algae or other aquatic plants	>30.07mg/L	2
	NOEC	72	Algae or other aquatic plants	>=1.15mg/L	2

beryllium acetate, basic	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

boric acid	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	74mg/L	2
	EC50	48	Crustacea	133mg/L	4
	EC50	72	Algae or other aquatic plants	54mg/L	2
	EC50	72	Algae or other aquatic plants	66mg/L	2
	NOEC	768	Fish	0.009mg/L	2

calcium carbonate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	>56000mg/L	4
	EC50	72	Algae or other aquatic plants	>14mg/L	2
	NOEC	72	Algae or other aquatic plants	14mg/L	2

cadmium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	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

chromium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	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

Initial Check Verification Standard 1

	cobalt	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	1.406mg/L	2
		EC50	48	Crustacea	>0.89mg/L	2
		EC50	72	Algae or other aquatic plants	0.144mg/L	2
		BCF	1344	Fish	0.99mg/L	4
		EC50	70	Algae or other aquatic plants	0.02mg/L	2
		NOEC	168	Algae or other aquatic plants	0.0018mg/L	2
	copper	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		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
	iron	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	0.05mg/L	2
		EC50	96	Algae or other aquatic plants	3.7mg/L	4
		BCF	24	Crustacea	0.000002mg/L	4
		EC50	504	Crustacea	4.49mg/L	2
		NOEC	504	Fish	0.52mg/L	2
	lead	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	0.0079mg/L	2
		EC50	48	Crustacea	0.029mg/L	2
		EC50	72	Algae or other aquatic plants	0.0205mg/L	2
		BCFD	8	Fish	4.324mg/L	4
		EC50	48	Algae or other aquatic plants	0.0217mg/L	2
		NOEC	672	Fish	0.00003mg/L	4
	magnesium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	541mg/L	2
		EC50	72	Algae or other aquatic plants	>20mg/L	2
		EC50	72	Algae or other aquatic plants	>20mg/L	2
		NOEC	72	Algae or other aquatic plants	>25.5mg/L	2
	molybdenum	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	609.1mg/L	2
		EC50	72	Algae or other aquatic plants	289.2mg/L	2
		BCF	336	Algae or other aquatic plants	64mg/L	4
		EC50	336	Algae or other aquatic plants	64mg/L	4
		NOEC	672	Crustacea	0.67mg/L	2
	nickel	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	0.0000475mg/L	4
		EC50	48	Crustacea	0.013mg/L	5
		EC50	72	Algae or other aquatic plants	0.0407mg/L	2
		BCF	1440	Algae or other aquatic plants	0.47mg/L	4
		EC50	720	Crustacea	0.0062mg/L	2
		NOEC	72	Algae or other aquatic plants	0.0035mg/L	2
	potassium nitrate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
		LC50	96	Fish	22.5mg/L	4
		EC50	96	Algae or other aquatic plants	1181.887mg/L	3

	EC50	384	Crustacea	49.116mg/L	3
selenium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	>0.0262mg/L	2
	EC50	48	Crustacea	>0.1603mg/L	2
	EC50	72	Algae or other aquatic plants	>0.00173mg/L	2
	BCF	504	Crustacea	0.711mg/L	4
	EC50	96	Algae or other aquatic plants	0.355mg/L	2
	NOEC	72	Algae or other aquatic plants	0.000547mg/L	2
strontium nitrate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	>40.3mg/L	2
	EC50	72	Algae or other aquatic plants	>43.3mg/L	2
	EC50	72	Algae or other aquatic plants	>43.3mg/L	2
	NOEC	96	Fish	>=40.3mg/L	2
thallium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	21mg/L	4
	EC50	96	Algae or other aquatic plants	0.13mg/L	4
	EC50	240	Algae or other aquatic plants	0.040876mg/L	4
	NOEC	720	Fish	0.04mg/L	5
ammonium metavanadate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.693mg/L	2
	EC50	48	Crustacea	2.387mg/L	2
	EC50	72	Algae or other aquatic plants	0.9894mg/L	2
	EC50	72	Algae or other aquatic plants	1.162mg/L	2
	NOEC	72	Algae or other aquatic plants	0.0168mg/L	2
zinc	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.00272mg/L	4
	EC50	48	Crustacea	0.04mg/L	5
	EC50	72	Algae or other aquatic plants	0.106mg/L	4
	BCF	360	Algae or other aquatic plants	9mg/L	4
	EC50	120	Fish	0.00033mg/L	5
	NOEC	336	Algae or other aquatic plants	0.00075mg/L	4
nitric acid	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	NOEC	16	Crustacea	107mg/L	4
hydrofluoric acid	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	51mg/L	2
	EC50	48	Crustacea	=270mg/L	1
	EC50	96	Crustacea	26-48mg/L	2
	NOEC	504	Fish	4mg/L	2
water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
bismuth	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
lithium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	EC50	24	Crustacea	1492mg/L	5
	NOEC	816	Fish	2.87mg/L	2

Legend: Extracted from 1. IUCALID 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

For Molybdenum:

Environmental Fate: Molybdenum is an essential micronutrient in plants and animals. It is commonly used in the manufacture of steel alloys. Based on the high concentration of molybdenum in all analyzed waste types, the exposure of the environment to molybdenum is regarded as significant. The limited amount of data regarding its toxicity makes it impossible to evaluate the potential for adverse environmental and health effects from molybdenum exposure. Molybdenum is generally found in two oxidation states in nature, Mo(IV) and Mo(VI). In oxidizing environments, Mo(VI) dominates and it is commonly present as molybdate. Natural molybdenum contains seven isotopes. Molybdenum oxidizes at elevated temperatures.

Atmospheric Fate: Molybdenum can be deposited via dry/wet deposition; however, atmospheric exposure has been identified as a minor source to terrestrial and aquatic habitats.

Terrestrial Fate: Molybdenum is a naturally occurring substance in soil. Soil molybdenum is a potentially toxic element, but no cases have been reported of molybdenum toxicity to animals from consumption of forage grown on sludge-amended soils. Microbes are expected to transform the substance.

Aquatic Fate: Molybdenum disulfide is sparingly soluble in water but oxidizes to more soluble molybdates, which are stable in water. At pH 3-5, molybdate frequently shifts to hydrogen molybdate. Low pH molybdenum is usually adsorbed to sediment composed of clay, or other minerals that are prone to weathering. Molybdenum in the water is expected to be taken up by aquatic organisms. Concentrations of the substance in sediments are by site-specific factors like flow rate, and other factors, (e.g. organic content, pH)

Ecotoxicology: Molybdenum cause adverse effects in ruminant animals. Livestock have been injured by forage grown on soils containing the element. The substance's toxicological properties in mammals are governed, to a large extent, by its interaction with copper and sulfur; residues of molybdenum alone are not sufficient to diagnose poisoning by the substance. Domestic ruminants, especially cattle, are especially sensitive to molybdenum poisoning, when copper and inorganic sulfate are deficient. The resistance of small laboratory animals, and wildlife, is at least 10X that of cattle. Mule deer are not adversely affected by the substance. The substance may have a negative impact on reproduction in domestic birds and there is inadequate data on its effects on waterfowl and most mammals.

For Vanadium Compounds:

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

Atmospheric Fate: Vanadium generally enters the atmosphere as an aerosol. Natural and man-made sources of vanadium tend to release large particles that are more likely to settle near the source. Smaller particles, such as those emitted from oil-fueled power plants, have a longer residence time in the atmosphere and are more likely to be transported farther away from the site of release.

Terrestrial Fate: Soil - Transport and partitioning of vanadium in soil is influenced by pH and reduction potential. Ferric hydroxides and solid bitumens (organic) are the main carriers of vanadium in the sedimentation process. Iron acts as a carrier for trivalent vanadium and is responsible for its diffusion through molten rocks where it becomes trapped during crystallization. Vanadium is fairly mobile in neutral or alkaline soils, but its mobility decreases in acidic soils. Under oxidizing, unsaturated conditions, some mobility is observed, but under reducing, saturated conditions, vanadium is immobile. Plants - Vanadium levels in terrestrial plants are dependent upon the amount of water-soluble vanadium available in the soil as well as pH and growing conditions. The uptake of vanadium into the above-ground parts of many plants is low, although root concentrations have shown some correlation with levels in the soil. Certain legumes have been shown to be vanadium accumulators and the root nodules of these plants may contain vanadium levels three times greater than those of the surrounding soil. Fly agaric (*Amanita muscaria*) mushrooms are known to actively accumulate vanadium.

Aquatic Fate: Vanadium is eventually adsorbed to hydroxides or associated with organic compounds and is deposited on the sea bed. Vanadium is transported in water by solution (13%) or suspension (87%). Upon entering the ocean, vanadium is deposited to the sea bed. Only about 0.001% of vanadium entering the oceans is estimated to persist in soluble form. Sorption and biochemical processes are thought to contribute to the extraction of vanadium from sea water. Adsorption to organic matter as well as to manganese oxide and ferric hydroxide results in the precipitation of dissolved vanadium. Biochemical processes are also of importance in the partitioning from sea water to sediment.

Ecotoxicity: Some marine organisms, in particular the sea squirts, bioconcentrate vanadium very efficiently, attaining body concentrations approximately 10,000 times greater than the ambient sea water. Upon the death of the organism, the body burden adds to the accumulation of vanadium in silt. In general, marine plants and invertebrates contain higher levels of vanadium than terrestrial plants and animals. In the terrestrial environment, bioconcentration is more commonly observed amongst the lower plant phyla than in the higher, seed-producing phyla. Vanadium appears to be present in all terrestrial animals; however tissue concentrations in vertebrates are often so low that detection is difficult. The highest levels of vanadium in terrestrial mammals are generally found in the liver and skeletal tissues. No data are available regarding biomagnification of vanadium within the food chain, but human studies suggest that it is unlikely. Bioaccumulation appears to be unlikely.

for Boron and Borates:

Environmental Fate: Boron is generally found in nature bound to oxygen and is never found as the free element. As an element, boron itself cannot be degraded in the environment, however; it may undergo various reactions that change the form of boron (e.g., precipitation, polymerization, and acid-base reactions) depending on conditions such as its concentration in water and pH. As boron is a natural component of the environment, individuals will have some exposure from foods and drinking water.

Atmospheric Fate: Atmospheric boron may be in the form of particulate matter or aerosols as borides, boron oxides, borates, borates, organoboron compounds, trihalide boron compounds, or borazines. Boron and borates will probably be removed from the atmosphere by precipitation and dry deposition. The half-life of airborne particles is usually on the order of days, depending on the size of the particle and atmospheric conditions.

Aquatic Fate: Borates are relatively soluble in water. Boron readily hydrolyses in water and, in concentrated solutions, may polymerize. The mineral content of water is not likely to control the fate of boron in water. Boron was found to not be significantly removed during the conventional treatment of waste water. Boron may, however; be co-precipitated with aluminium, silicon, or iron to form hydroxyborate compounds on the surfaces of minerals. Waterborne boron may be adsorbed by soils and sediments. Adsorption-desorption reactions are expected to be the only significant mechanism that will influence the fate of boron in water.

Terrestrial Fate: Soil - Boron is added to farmland as a soil improving agent, but there is not sufficient data to evaluate its effect on soil organisms. The extent of boron adsorption depends on the pH of the water and the chemical composition of the soil. The greatest adsorption is generally observed at pH 7.5-9.0. The single most important property of soil that will influence the mobility of boron is the abundance of amorphous aluminium oxide. The extent of boron adsorption has also been attributed to the levels of iron oxide, and to a lesser extent, the organic matter present in the soil, although other studies found that the amount of organic matter present was not important. The adsorption of boron may not be reversible in some soils. Most boron compounds are transformed to borates in soil due to the presence of moisture. Borates themselves are not further degraded in soil, however; borates can exist in a variety of forms in soil. Borates are removed from soils by water leaching and by assimilation by plants. Surface soil, unpolluted waterways and seawater all typically contain significant amounts of boron as borate. Plants - Boron is an essential micronutrient for healthy growth of plants, however, it can be harmful to boron sensitive plants in higher quantities. In some areas such as the American Southwest, boron occurs naturally in surface waters in concentrations that have been shown to be toxic to commercially important plants.

Ecotoxicity: It is unlikely that boron is bioconcentrated significantly by organisms from water. Boron is not expected to bioaccumulate and bioconcentration factors for fish, plants and invertebrates are low. Boron is not regarded to be dangerous to aquatic organisms. In aquatic environments low concentrations of borates generally promote the growth of algae, whereas higher concentrations inhibited algal growth. Boron has little effect on freshwater algae and water fleas. The toxicity of boron in fish is often higher in soft water than in hard water. Zebra fish and rainbow trout are the most sensitive species to the effects of boron.

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
barium carbonate	LOW	LOW
boric acid	LOW	LOW
potassium nitrate	LOW	LOW
ammonium metavanadate	HIGH	HIGH
water	LOW	LOW
ammonium phosphate, monobasic	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
barium carbonate	LOW (LogKOW = -0.4605)
boric acid	LOW (BCF = 0)
potassium nitrate	LOW (LogKOW = 0.209)
ammonium metavanadate	LOW (LogKOW = 2.229)
water	LOW (LogKOW = -1.38)
ammonium phosphate, monobasic	LOW (LogKOW = -0.7699)

Mobility in soil

Ingredient	Mobility
barium carbonate	HIGH (KOC = 1)
boric acid	LOW (KOC = 35.04)
potassium nitrate	LOW (KOC = 14.3)
ammonium metavanadate	LOW (KOC = 35.04)
water	LOW (KOC = 14.3)
ammonium phosphate, monobasic	HIGH (KOC = 1)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product. ▶ 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 cleaned and destroyed.
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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. (contains nitric acid)	
Transport hazard class(es)	Class	8
	Subrisk	Not Applicable
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	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. (contains nitric acid)	
Transport hazard class(es)	ICAO/IATA Class	8
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	8L
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	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. * (contains nitric acid)	
Transport hazard class(es)	IMDG Class	8
	IMDG Subrisk	Not Applicable
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	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

Source	Product name	Pollution Category	Ship Type
IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk	Nitric acid (70% and over) Nitric acid (less than 70%)	Y; Y	2 2

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 - 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 - 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 ACGIH Threshold Limit Values (TLV) - Carcinogens
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
 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

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 - Alaska Limits for Air Contaminants
 US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELEs)
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELEs)
 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 - Minnesota Permissible Exposure Limits (PELs)
 US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
 US - Pennsylvania - 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 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 A Known to be Human Carcinogens
 US NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

BARIUM CARBONATE(513-77-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US EPA Carcinogens Listing
 US EPCRA Section 313 Chemical List

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

BERYLLIUM ACETATE, BASIC(19049-40-2) 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 - Chronic Reference Exposure Levels and Target Organs (CRELEs)
 US - California Permissible Exposure Limits for Chemical Contaminants
 US - Hawaii Air Contaminant Limits
 US - Idaho - Acceptable Maximum Peak Concentrations
 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 - Oregon Permissible Exposure Limits (Z-2)
 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 - 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 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 OSHA Permissible Exposure Levels (PELs) - Table Z1
 US OSHA Permissible Exposure Levels (PELs) - Table Z2
 US OSHA Permissible Exposure Levels (PELs) - Table Z3

BORIC ACID(10043-35-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
 US ACGIH Threshold Limit Values (TLV)
 US ACGIH Threshold Limit Values (TLV) - Carcinogens

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

CALCIUM CARBONATE(471-34-1) 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 NIOSH Recommended Exposure Limits (RELs)
 US OSHA Permissible Exposure Levels (PELs) - Table Z1
 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 - 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 - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity	US - Washington Permissible exposure limits of air contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California Permissible Exposure Limits for Chemical Contaminants	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - California Proposition 65 - Carcinogens	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 - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity	US ACGIH Threshold Limit Values (TLV)
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - California Proposition 65 - Reproductive Toxicity	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Hawaii Air Contaminant Limits	US Clean Air Act - Hazardous Air Pollutants
US - Idaho - Acceptable Maximum Peak Concentrations	US CWA (Clean Water Act) - Priority Pollutants
US - Idaho - Limits for Air Contaminants	US CWA (Clean Water Act) - Toxic Pollutants
US - Massachusetts - Right To Know Listed Chemicals	US EPA Carcinogens Listing
US - Michigan Exposure Limits for Air Contaminants	US EPCRA Section 313 Chemical List
US - Minnesota Permissible Exposure Limits (PELs)	US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens	US NIOSH Recommended Exposure Limits (RELs)
US - Oregon Permissible Exposure Limits (Z-1)	US OSHA Carcinogens Listing
US - Oregon Permissible Exposure Limits (Z-2)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z2
US - Rhode Island Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	

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 - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	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 ACGIH Threshold Limit Values (TLV)
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals	US Clean Air Act - Hazardous Air Pollutants
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - Priority Pollutants
US - Oregon Permissible Exposure Limits (Z-1)	US CWA (Clean Water Act) - Toxic Pollutants
US - Pennsylvania - Hazardous Substance List	US EPCRA Section 313 Chemical List
US - Rhode Island 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

COBALT(7440-48-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	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 - California Proposition 65 - Carcinogens	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US ACGIH Threshold Limit Values (TLV)
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Michigan Exposure Limits for Air Contaminants	US Clean Air Act - Hazardous Air 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 B.
US - Oregon Permissible Exposure Limits (Z-1)	US NIOSH Recommended Exposure Limits (RELs)
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Rhode Island Hazardous Substance List	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 - 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	

COPPER(7440-50-8) 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 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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - Priority Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	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 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

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

US - Oregon Permissible Exposure Limits (Z-1)

LEAD(7439-92-1) 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 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

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)

MOLYBDENUM(7439-98-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Alaska Limits for Air Contaminants

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

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

POTASSIUM NITRATE(7757-79-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals

US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List

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

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 OSHA Permissible Exposure Levels (PELs) - Table Z3

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

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 - 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 OSHA Permissible Exposure Levels (PELs) - Table Z3

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 ACGIH Threshold Limit Values (TLV)

US ACGIH Threshold Limit Values (TLV) - Carcinogens

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 - 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

US EPCRA Section 313 Chemical List

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 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

STRONTIUM NITRATE(10042-76-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US - Massachusetts - Right To Know Listed Chemicals

US - Pennsylvania - Hazardous Substance List

US - Rhode Island Hazardous Substance List

US EPCRA Section 313 Chemical List

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

THALLIUM(7440-28-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

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 ACGIH Threshold Limit Values (TLV)

US CWA (Clean Water Act) - Priority Pollutants

US CWA (Clean Water Act) - Toxic Pollutants

US EPCRA Section 313 Chemical List

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 - 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)

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 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 OSHA Permissible Exposure Levels (PELs) - Table Z3

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 - 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

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 CWA (Clean Water Act) - List of Hazardous Substances

US EPCRA Section 313 Chemical List

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

HYDROFLUORIC ACID(7664-39-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	US - Washington Permissible exposure limits of air contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical 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 - Hawaii Air Contaminant Limits	US ACGIH Threshold Limit Values (TLV)
US - Idaho - Acceptable Maximum Peak Concentrations	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Idaho - Limits for Air Contaminants	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Massachusetts - Right To Know Listed Chemicals	US Clean Air Act - Hazardous Air Pollutants
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - List of Hazardous Substances
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - Oregon Permissible Exposure Limits (Z-1)	US NIOSH Recommended Exposure Limits (RELs)
US - Oregon Permissible Exposure Limits (Z-2)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z2
US - Rhode Island Hazardous Substance List	US SARA Section 302 Extremely Hazardous Substances
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	

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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BISMUTH(7440-69-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

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

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

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

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

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

US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	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 - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Idaho - Limits for Air Contaminants	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants	US Clean Air Act - Hazardous Air Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - Oregon Permissible Exposure Limits (Z-1)	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

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
Nickel	100	45.4
Selenium	100	45.4
Thallium	1000	454
Ammonium vanadate	1000	454
Zinc	1000	454
Nitric acid	1000	454
Hydrofluoric acid	100	45.4

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, Cobalt metal powder, Lead and lead compounds: Lead, Nickel (Metallic) Listed

National Inventory	Status
Australia - AICS	N (beryllium acetate, basic)
Canada - DSL	N (beryllium acetate, basic)
Canada - NDSL	N (bismuth; thallium; lead; zinc; strontium nitrate; ammonium metavanadate; beryllium acetate, basic; magnesium; copper; water; lithium; ammonium phosphate, monobasic; selenium; aluminium; molybdenum; arsenic; cobalt; nickel; manganese(II) acetate tetrahydrate; boric acid; iron; chromium; barium carbonate; potassium nitrate; hydrofluoric acid; cadmium; nitric acid)
China - IECSC	N (beryllium acetate, basic)
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (bismuth; thallium; zinc; beryllium acetate, basic; magnesium; copper; water; lithium; ammonium phosphate, monobasic; selenium; aluminium; molybdenum; arsenic; cobalt; nickel; manganese(II) acetate tetrahydrate; boric acid; iron; chromium; hydrofluoric acid; cadmium; nitric acid)
Korea - KECI	N (beryllium acetate, basic)
New Zealand - NZIoC	N (beryllium acetate, basic)
Philippines - PICCS	N (beryllium acetate, basic)
USA - TSCA	N (beryllium acetate, basic)
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
barium carbonate	513-77-9, 98616-28-5, 25070-31-9
boric acid	10043-35-3, 11113-50-1, 41685-84-1
calcium carbonate	471-34-1, 13397-26-7, 15634-14-7, 1317-65-3, 72608-12-9, 878759-26-3, 63660-97-9, 459411-10-0, 198352-33-9, 146358-95-4
copper	7440-50-8, 133353-46-5, 133353-47-6, 195161-80-9, 65555-90-0, 72514-83-1
strontium nitrate	10042-76-9, 13470-05-8
hydrofluoric acid	7664-39-3, 790596-14-4

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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