# QCS-1-A

## High-Purity Standards

Chemwatch Hazard Alert Code: **3**

Catalogue number: **QCS-1-A**
Version No: **4.4**
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: **12/06/2016**
Print Date: **12/06/2016**
S.GHS.USA.EN

## SECTION 1 IDENTIFICATION

### Product Identifier

| | |
|---|---|
| **Product name** | QCS-1-A |
| **Synonyms** | 100µg/mL Aluminum, Arsenic,Boron, Barium, Beryllium, Calcium, Cadmium, Cobalt, Chromium, Iron, Potassium, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Selenium, Silica, Uranium, Vanadium, Yttrium, Zirconium in 4% HNO3 + Tr HF |
| **Proper shipping name** | Corrosive liquid, acidic, inorganic, n.o.s (contains nitric acid and hydrofluoric acid) |
| **Other means of identification** | QCS-1-A |

### Recommended use of the chemical and restrictions on use

| | |
|---|---|
| **Relevant identified uses** | Use according to manufacturer's directions. |

### 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 4, Metal Corrosion Category 1, Skin Corrosion/Irritation Category 1A |

### Label elements

| | |
|---|---|
| **GHS label elements** |  |
| **SIGNAL WORD** | **DANGER** |

### Hazard statement(s)

| | |
|---|---|
| **H318** | Causes serious eye damage. |
| **H302** | Harmful if swallowed. |
| **H312** | Harmful 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. |

### Precautionary statement(s) Response

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

### Precautionary statement(s) Storage

| | |
|---|---|
| **P405** | Store locked up. |

### Precautionary statement(s) Disposal

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

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

### Substances

See section below for composition of Mixtures

### Mixtures

| CAS No | %[weight] | Name |
|---|---|---|
| 7429-90-5 | 0.01 | aluminium |
| 7440-38-2 | 0.01 | arsenic |
| 10022-31-8 | 0.01 (as Ba) | barium nitrate |
| 543-81-7 | 0.01 (as Be) | beryllium acetate |
| 10043-35-3 | 0.01 (as B) | boric acid |
| 471-34-1 | 0.01 (as Ca) | calcium carbonate |
| 7440-43-9 | 0.01 | cadmium |
| 7440-47-3 | 0.01 | chromium |
| 7440-48-4 | 0.01 | cobalt |
| 7439-89-6 | 0.01 | iron |
| 554-13-2 | 0.01 (as Li) | lithium carbonate |
| 7439-95-4 | 0.01 | magnesium |
| 6156-78-1 | 0.01 (as Mn) | manganese(II) acetate tetrahydrate |
| 7439-98-7 | 0.01 | molybdenum |
| 7440-02-0 | 0.01 | nickel |
| 7722-76-1 | 0.01 (as PO4) | ammonium phosphate, monobasic |
| 7757-79-1 | 0.01 (as K) | potassium nitrate |
| 16919-19-0 | 0.01 (as Si) | ammonium fluorosilicate |
| 7782-49-2 | 0.01 | selenium |
| 1344-59-8 | 0.01 (as U) | uranium mixed oxides (U3O8) |
| 7803-55-6 | 0.01 (as V) | ammonium metavanadate |
| 11130-29-3 | 0.01 (as Y) | yttrium oxide |
| 7440-66-6 | 0.01 | zinc |
| 7697-37-2 | 4 | nitric acid |
| 7664-39-3 | 0-0.49 | hydrofluoric acid |
| 7732-18-5 | balance | water |

## SECTION 4 FIRST-AID MEASURES

### Description of first aid measures

| | |
|---|---|
| **Eye Contact** | If this product comes in contact with the eyes:<br>▸ Immediately hold eyelids apart and flush the eye continuously with running water.<br>▸ 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.<br>▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.<br>▸ Transport to hospital or doctor without delay.<br>▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| **Skin Contact** | If there is evidence of severe skin irritation or skin burns:<br>▸ Avoid further contact. Immediately remove contaminated clothing, including footwear.<br>▸ Flush skin under running water for 15 minutes.<br>▸ Avoiding contamination of the hands, massage calcium gluconate gel into affected areas, pay particular attention to creases in skin.<br>▸ Contact the Poisons Information Centre. |

**Continued...**

| | |
|---|---|
| | ▸ Continue gel application for at least 15 minutes after burning sensation ceases.<br>▸ If pain recurs, repeat application of calcium gluconate gel or apply every 20 minutes.<br>▸ 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.<br>▸ Transport to hospital, or doctor, urgently. |
| **Inhalation** | ▸ If fumes or combustion products are inhaled remove from contaminated area.<br>▸ Lay patient down. Keep warm and rested.<br>▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.<br>▸ 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.<br>▸ Transport to hospital, or doctor, without delay.<br>▸ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.<br>▸ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).<br>▸ 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.<br>▸ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.<br>**This must definitely be left to a doctor or person authorised by him/her.**<br>(ICSC13719)<br>For massive exposures:<br>▸ If dusts, vapours, aerosols, fumes or combustion products are inhaled, remove from contaminated area.<br>▸ Lay patient down.<br>▸ Keep warm and rested.<br>▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.<br>▸ 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.<br>▸ If victim is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth.<br>▸ Transport to hospital, or doctor, urgently. |
| **Ingestion** | ▸ For advice, contact a Poisons Information Centre or a doctor at once.<br>▸ Urgent hospital treatment is likely to be needed.<br>▸ If swallowed do **NOT** induce vomiting.<br>▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.<br>▸ Observe the patient carefully.<br>▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.<br>▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.<br>▸ 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

**Continued...**

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 |
| | 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

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

### Special hazards arising from the substrate or mixture

| | |
|---|---|
| **Fire Incompatibility** | None known. |

### Special protective equipment and precautions for fire-fighters

| | |
|---|---|
| **Fire Fighting** | |
| **Fire/Explosion Hazard** | ▸ Non combustible.<br>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.<br>May emit corrosive fumes. |

## 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** | ▸ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.<br>▸ Clean up all spills immediately. |
| **Major Spills** | ▸ Clear area of personnel and move upwind. |

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

## SECTION 7 HANDLING AND STORAGE

**Continued...**

### Precautions for safe handling

| | |
|---|---|
| **Safe handling** | ▸ Avoid all personal contact, including inhalation. |
| **Other information** | ▸ Store in original containers. |

### Conditions for safe storage, including any incompatibilities

| | |
|---|---|
| **Suitable container** | ▸ **DO NOT** use aluminium or galvanised containers<br>▸ Lined metal can, lined metal pail/ can.<br>For low viscosity materials<br>▸ Drums and jerricans must be of the non-removable head type.<br>▸ Material is corrosive to most metals, glass and other siliceous materials. |
| **Storage incompatibility** | For aluminas (aluminium oxide):<br>▸ Incompatible with hot chlorinated rubber.<br>▸ Inorganic acids are generally soluble in water with the release of hydrogen ions.<br>▸ WARNING: Avoid or control reaction with peroxides.<br>Salts of inorganic fluoride:<br>▸ react with water forming acidic solutions.<br>▸ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.<br>Hydrogen fluoride:<br>▸ 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<br>▸ 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<br>▸ 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. |

## 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/m3 / 5 mg/m3 | Not Available | Not Available | Total dust; (as Al) / (as Al) |
| US ACGIH Threshold Limit Values (TLV) | aluminium | Aluminum metal and insoluble compounds | 1 mg/m3 | 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/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | arsenic | Arsenic-inorganic compounds | 0.01 mg/m3 | 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/m3 | 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/m3 | Ca See Appendix A |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | barium nitrate | Barium, soluble compounds | 0.5 mg/m3 | Not Available | Not Available | (as Ba) |
| US ACGIH Threshold Limit Values (TLV) | barium nitrate | Barium and soluble compounds, as Ba(1990) | 0.5 mg/m3 | Not Available | Not Available | TLV® Basis: Eye, skin, & GI irr; muscular stim |
| US NIOSH Recommended Exposure Limits (RELs) | barium nitrate | Barium dinitrate, Barium(II) nitrate (1:2), Barium salt of nitric acid | 0.5 mg/m3 | Not Available | Not Available | [*Note: The REL also applies to other soluble barium compounds (as Ba) except Barium sulfate.] |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | beryllium acetate | Silicates - Mica / Silicates - Soapstone / Silicates-Soapstone / Silicates - Talc / Silicates - Tremolite, asbestiform | 0.1 mg/m3 | Not Available | Not Available | See Table Z-3;less than 1% crystalline silica(respirable dust) / See Table Z-3;less than 1% crystalline silica, total dust / See Table Z-3;less than 1% crystalline silica, respirable dust / less than 1% crystalline silica;see 29 CFR 1910.1001;See Table Z-3;(containing asbestos); use asbestos limit; (STEL (Excursion limit)(as averaged over a sampling period of 30 minutes)) / less than 1% crystalline silica;See Table Z-3, (containing no asbestos), respirable dust / (as quartz), respirable dust;ess than 1% crystalline silica;see 1910.1001;(STEL (Excursion limit)(as averaged over a sampling period of 30 minutes)) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | beryllium acetate | Beryllium and beryllium compounds / Zirconium compounds | 5 mg/m3 | Not Available | Not Available | See Table Z-2;(as Be) / (as Zr) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z2 | beryllium acetate | Beryllium and beryllium compounds | 0.002 mg/m3 | Not Available | 0.005 mg/m3 | (Z37.29–1970) |

**Continued...**

| | | | | | | |
|---|---|---|---|---|---|---|
| US OSHA Permissible Exposure Levels (PELs) - Table Z3 | beryllium acetate | 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 | Beryllium and compounds, as Be / Beryllium and compounds, as Be - Soluble and insoluble compounds | 0.00005 mg/m3 | 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/m3 | 6 mg/m3 | Not Available | TLV® Basis: URT irr |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | calcium carbonate | Calcium carbonate / Calcium carbonate - Respirable fraction | 15 mg/m3 / 5 mg/m3 | 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/m3 | 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/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | cadmium | Cadmium | 0.005 mg/m3 | Not Available | Not Available | see 1910.1027;(as Cd) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z2 | cadmium | Cadmium fume / Cadmium dust | 0.1 mg/m3 / 0.2 mg/m3 | Not Available | 0.3 mg/m3 / 0.6 mg/m3 | (Z37.5–1970);This standard applies to any operations or sectors for which the Cadmium standard, 1910.1027, is stayed or otherwise not in effect |
| US ACGIH Threshold Limit Values (TLV) | cadmium | Cadmium | 0.01 mg/m3 | Not Available | Not Available | TLV® Basis: Kidney dam; BEI |
| US NIOSH Recommended Exposure Limits (RELs) | cadmium | Cadmium metal: Cadmium | Not Available | Not Available | Not Available | Ca See Appendix A [*Note: The REL applies to all Cadmium compounds (as Cd).] |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | chromium | Chromium metal and insol. salts | 1 mg/m3 | Not Available | Not Available | (as Cr) |
| US ACGIH Threshold Limit Values (TLV) | chromium | Chromium, and inorganic compounds, as Cr - Metal and Cr III compounds | 0.5 mg/m3 | Not Available | Not Available | TLV® Basis: URT & skin irr |
| US NIOSH Recommended Exposure Limits (RELs) | chromium | Chrome, Chromium | 0.5 mg/m3 | Not Available | Not Available | See Appendix C |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | 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 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 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 | manganese(II) acetate tetrahydrate | Manganese compounds / Manganese fume | Not Available | Not Available | 5 mg/m3 | (as Mn) |

**Continued...**

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | ammonium fluorosilicate | Silicates - Mica / Silicates - Soapstone / Silicates- Soapstone / Silicates - Talc / Silicates - Tremolite, asbestiform | 0.1 mg/m3 | Not Available | Not Available | See Table Z-3;less than 1% crystalline silica(respirable dust) / See Table Z-3;less than 1% crystalline silica, total dust / See Table Z-3;less than 1% crystalline silica, respirable dust / less than 1% crystalline silica;see 29 CFR 1910.1001;See Table Z-3;(containing asbestos); use asbestos limit; (STEL (Excursion limit)(as averaged over a sampling period of 30 minutes)) / less than 1% crystalline silica;See Table Z-3, (containing no asbestos), respirable dust / (as quartz), respirable dust;ess than 1% crystalline silica;see 1910.1001;(STEL (Excursion limit)(as averaged over a sampling period of 30 minutes)) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | ammonium fluorosilicate | Fluorides | 2.5 mg/m3 | Not Available | Not Available | as F) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z2 | ammonium fluorosilicate | Fluoride as dust | 2.5 mg/m3 | Not Available | Not Available | (Z37.28–1969) |
| US OSHA Permissible Exposure Levels (PELs) - Table Z3 | ammonium fluorosilicate | 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 OSHA Permissible Exposure Levels (PELs) - Table Z1 | selenium | Selenium compounds | 0.2 mg/m3 | Not Available | Not Available | (as Se) |
| US ACGIH Threshold Limit Values (TLV) | selenium | Selenium and compounds, as Se | 0.2 mg/m3 | Not Available | Not Available | TLV® Basis: Eye & URT irr |
| US NIOSH Recommended Exposure Limits (RELs) | selenium | Elemental selenium, Selenium alloy | 0.2 mg/m3 | Not Available | Not Available | [*Note: The REL also applies to other selenium compounds (as Se) except Selenium hexafluoride.] |
| US OSHA Permissible Exposure Levels (PELs) - Table Z1 | uranium mixed oxides (U3O8) | Uranium - Insoluble compounds | 0.25 mg/m3 | Not Available | Not Available | (as U) |
| US ACGIH Threshold Limit Values (TLV) | uranium mixed oxides (U3O8) | Uranium (natural) Soluble and insoluble compounds, as U | 0.2 mg/m3 | 0.6 mg/m3 | Not Available | TLV® Basis: Kidney dam; BEI |
| US ACGIH Threshold Limit Values (TLV) | yttrium oxide | Yttrium and compounds, as Y | 1 mg/m3 | Not Available | Not Available | TLV® Basis: Pulm fibrosis |
| 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) |

**Continued...**

| | | | | | | |
|---|---|---|---|---|---|---|
| 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] |

**EMERGENCY LIMITS**

| Ingredient | Material name | TEEL-1 | TEEL-2 | TEEL-3 |
|---|---|---|---|---|
| barium nitrate | Barium nitrate | 2.9 mg/m3 | 350 mg/m3 | 2,100 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 |
| iron | Iron | 3.2 mg/m3 | 35 mg/m3 | 150 mg/m3 |
| lithium carbonate | Lithium carbonate | 0.44 mg/m3 | 4.8 mg/m3 | 100 mg/m3 |
| magnesium | Magnesium | 18 mg/m3 | 200 mg/m3 | 1,200 mg/m3 |
| manganese(II) acetate tetrahydrate | Acetic acid, manganese(2+) salt, tetrahydrate | 13 mg/m3 | 22 mg/m3 | 740 mg/m3 |
| manganese(II) acetate tetrahydrate | Acetic acid, manganese(II) salt (2:1) | 9.4 mg/m3 | 16 mg/m3 | 96 mg/m3 |
| molybdenum | Molybdenum | 30 mg/m3 | 330 mg/m3 | 2,000 mg/m3 |
| nickel | Nickel | 4.5 mg/m3 | 50 mg/m3 | 99 mg/m3 |
| ammonium phosphate, monobasic | Ammonium dihydrogen phosphate; (Monoammonium phosphate) | 17 mg/m3 | 190 mg/m3 | 1,100 mg/m3 |
| potassium nitrate | Potassium nitrate | 9 mg/m3 | 100 mg/m3 | 600 mg/m3 |
| ammonium fluorosilicate | Ammonium hexafluorosilicate; (Ammonium silicofluoride) | 12 mg/m3 | 130 mg/m3 | 780 mg/m3 |
| selenium | Selenium | 0.6 mg/m3 | 6.6 mg/m3 | 40 mg/m3 |
| uranium mixed oxides (U3O8) | Uranium oxide; (Triuranium octaoxide) | 0.71 mg/m3 | Not Available | Not Available |
| ammonium metavanadate | Ammonium vanadate; (Ammonium vanadium oxide; Ammonium metavanadate) | 0.01 mg/m3 | 0.11 mg/m3 | 80 mg/m3 |
| yttrium oxide | Yttrium oxide | 3.5 mg/m3 | 40 mg/m3 | 240 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 |

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| aluminium | Not Available | Not Available |
| arsenic | 100 mg/m3 | 5 mg/m3 |
| barium nitrate | 1,100 mg/m3 | 50 mg/m3 |
| beryllium acetate | 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 |
| iron | Not Available | Not Available |
| lithium carbonate | Not Available | Not Available |
| magnesium | Not Available | Not Available |
| manganese(II) acetate tetrahydrate | N.E. / N.E. | 500 mg/m3 |
| molybdenum | N.E. / N.E. | 5,000 mg/m3 |
| nickel | N.E. / N.E. | 10 mg/m3 |
| ammonium phosphate, monobasic | Not Available | Not Available |
| potassium nitrate | Not Available | Not Available |
| ammonium fluorosilicate | Not Available | Not Available |
| selenium | Unknown mg/m3 / Unknown ppm | 1 mg/m3 |
| uranium mixed oxides (U3O8) | 30 mg/m3 | 10 mg/m3 |
| ammonium metavanadate | Not Available | Not Available |
| yttrium oxide | Not Available | Not Available |
| zinc | Not Available | Not Available |

**Continued...**

| | | |
|---|---|---|
| nitric acid | 100 ppm | 25 ppm |
| hydrofluoric acid | 30 ppm | 30 [Unch] ppm |
| water | Not Available | Not Available |

### Exposure controls

| | |
|---|---|
| **Appropriate engineering controls** | Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. |
| **Personal protection** |  |
| **Eye and face protection** | ▸ 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. |
| **Skin protection** | See Hand protection below |
| **Hands/feet protection** | ▸ Elbow length PVC gloves<br>▸ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots. |
| **Body protection** | See Other protection below |
| **Other protection** | ▸ Overalls. |
| **Thermal hazards** | Not Available |

### Respiratory protection

**Type A Filter of sufficient capacity.**

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

### Information on basic physical and chemical properties

| | |
|---|---|
| **Appearance** | colorless to 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** | ▸ Contact with alkaline material liberates heat |
| **Possibility of hazardous reactions** | See section 7 |
| **Conditions to avoid** | See section 7 |
| **Incompatible materials** | See section 7 |
| **Hazardous decomposition products** | See section 5 |

## SECTION 11 TOXICOLOGICAL INFORMATION

### Information on toxicological effects

| | |
|---|---|
| **Inhaled** | Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful. |

**Continued...**

| | |
|---|---|
| | The material can cause respiratory irritation in some persons.<br>Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.<br>Bronchial and alveolar exudate are apparent in animals exposed to molybdenum by inhalation.<br>Exposure to vapours of some rare earth salts can cause sensitivity to heat, itching, and increased sensitivity of smell and taste.<br>Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort.<br>Acute inhalation exposures to hydrogen fluoride (hydrofluoric acid) vapours produce severe eye, nose, and throat irritation; delayed fever, cyanosis, and pulmonary edema; and may cause death. |
| **Ingestion** | 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.<br>The kidney and liver can be damaged by uranium, causing excessive acid and urea in the blood and generalised ill health.<br>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus.<br>Molybdenum, an essential trace element, can in large doses hamper growth and cause loss of appetite, listlessness and diarrhoea.<br>Fluoride causes severe loss of calcium in the blood, with symptoms appearing several hours later including painful and rigid muscle contractions of the limbs.<br>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.<br>Borate poisoning causes nausea, vomiting, diarrhoea and pain in the upper abdomen. |
| **Skin Contact** | Skin contact with the material may be harmful; systemic effects may result following absorption.<br>Though considered non-harmful, slight irritation may result from contact because of the abrasive nature of the aluminium oxide particles.<br>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.<br>Contact of the skin with liquid hydrofluoric acid (hydrogen fluoride) may cause severe burns, erythema, and swelling, vesiculation, and serious crusting.<br>Boric acid is not absorbed via intact skin but absorbed on broken or inflamed skin.<br>Fluorides are easily absorbed through the skin and cause death of soft tissue and erode bone.<br>Open cuts, abraded or irritated skin should not be exposed to this material<br>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. |
| **Eye** | If applied to the eyes, this material causes severe eye damage.<br>Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.<br>Experiments in which a 20-percent aqueous solution of hydrofluoric acid (hydrogen fluoride) was instilled into the eyes of rabbits caused immediate damage in the form of total corneal opacification and conjunctival ischemia; within an hour, corneal stroma edema occurred, followed by necrosis of anterior ocular structures. |
| **Chronic** | Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.<br>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.<br>Animal testing shows long term exposure to aluminium oxides may cause lung disease and cancer, depending on the size of the particle.<br>High levels of molybdenum can cause joint problems in the hands and feet with pain and lameness.<br>Yttrium is a rare earth metal - heavy type (yttrium family).<br>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining.<br>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.<br>Borate can accumulate in the testes and deplete germ cells and cause withering of the testicles, according to animal testing.<br>Extended exposure to inorganic fluorides causes fluorosis, which includes signs of joint pain and stiffness, tooth discolouration, nausea and vomiting, loss of appetite, diarrhoea or constipation, weight loss, anaemia, weakness and general unwellness.<br>Hydrogen fluoride easily penetrates the skin and causes destruction and corrosion of the bone and underlying tissue. |

| **QCS-1-A** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Not Available | Not Available |

| **aluminium** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Oral (rat) LD50: >2000 mg/kg[1] | Not Available |

| **arsenic** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Oral (rat) LD50: 763 mg/kg[2] | Not Available |

| **barium nitrate** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Oral (rat) LD50: 355 mg/kg[2] | Eye (rabbit):100 mg/24h - moderate |
| | Skin (rabbit): 500 mg/24h - mild |

| **beryllium acetate** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Not Available | Not Available |

| **boric acid** | |
|---|---|
| **TOXICITY** | **IRRITATION** |
| Dermal (rabbit) LD50: >2000 mg/kg[1] | Skin (human): 15 mg/3d -I- mild |
| Inhalation (rat) LC50: >0.16 mg/l/4hr[1] | |
| Oral (rat) LD50: 2500 mg/kg[2] | |

| **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 |

**Continued...**

**cadmium**

| TOXICITY | IRRITATION |
|---|---|
| Inhalation (monkey) LC50: 0.03 mg/L15 min[1] | Not Available |
| Inhalation (monkey) LC50: 0.0467 mg/L15 min[1] | |
| Inhalation (monkey) LC50: 0.204 mg/L15 min[1] | |
| Inhalation (monkey) LC50: 0.23 mg/L15 min[1] | |
| Inhalation (monkey) LC50: 0.94 mg/L15 min[1] | |
| Inhalation (mouse) LC50: >0.00902 mg/L15 min[1] | |
| Inhalation (rabbit) LC50: >0.0224 mg/L15 min[1] | |
| Inhalation (rat) LC50: 0.025 mg/L/30m[2] | |
| Oral (rat) LD50: >63-<259 mg/kg>[1] | |

**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] | |

**iron**

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: 7500 mg/kg[1] | Not Available |

**lithium carbonate**

| TOXICITY | IRRITATION |
|---|---|
| dermal (rat) LD50: >2000 mg/kg[1] | Eye (rabbit) : Moderate * |
| Inhalation (rat) LC50: >0.8 mg/L/4h *[2] | Skin (rabbit) : Mild * |
| Oral (rat) LD50: 525 mg/kg[2] | |

**magnesium**

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: >2000 mg/kg[1] | Not Available |

**manganese(II) acetate tetrahydrate**

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: 3730 mg/kg[2] | Not Available |

**molybdenum**

| TOXICITY | IRRITATION |
|---|---|
| dermal (rat) LD50: >2000 mg/kg[1] | Not Available |
| Oral (rat) LD50: >2000 mg/kg[1] | |

**nickel**

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: 5000 mg/kg[2] | Not Available |

**ammonium phosphate, monobasic**

| TOXICITY | IRRITATION |
|---|---|
| dermal (rat) LD50: >5000 mg/kg[1] | Not Available |
| Oral (rat) LD50: >1000 mg/kg[1] | |

**potassium nitrate**

| TOXICITY | IRRITATION |
|---|---|
| dermal (rat) LD50: >5000 mg/kg[1] | Not Available |
| Oral (rat) LD50: >2000 mg/kg[1] | |

**ammonium fluorosilicate**

| TOXICITY | IRRITATION |
|---|---|
| Oral (mouse) LD50: 70 mg/kg[2] | Not Available |

**Continued...**

| | |
|---|---|
| **selenium** | |

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: 6700 mg/kg[2] | Not Available |

| | |
|---|---|
| **uranium mixed oxides (U3O8)** | |

| TOXICITY | IRRITATION |
|---|---|
| Not Available | Not Available |

| | |
|---|---|
| **ammonium metavanadate** | |

| TOXICITY | IRRITATION |
|---|---|
| dermal (rat) LD50: 2102 mg/kg[2] | Not Available |
| Inhalation (rat) LC50: 0.0078 mg/L/4hr[2] | |
| Oral (rat) LD50: 58.1 mg/kg[2] | |

| | |
|---|---|
| **yttrium oxide** | |

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: >5000 mg/kg[2] | Not Available |

| | |
|---|---|
| **zinc** | |

| TOXICITY | IRRITATION |
|---|---|
| Dermal (rabbit) LD50: 1130 mg/kg[2] | Not Available |
| Oral (rat) LD50: >2000 mg/kg[1] | |

| | |
|---|---|
| **nitric acid** | |

| TOXICITY | IRRITATION |
|---|---|
| Inhalation (rat) LC50: 0.13 mg/L/4hr[2] | Not Available |
| Inhalation (rat) LC50: 2500 ppm/1h *t[2] | |

| | |
|---|---|
| **hydrofluoric acid** | |

| TOXICITY | IRRITATION |
|---|---|
| Inhalation (rat) LC50: 1.1 mg/L/60M[2] | Eye (human): 50 mg - SEVERE |
| Inhalation (rat) LC50: 1276 ppm/1hr[2] | |

| | |
|---|---|
| **water** | |

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50: >90000 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.<br>Tumorigenic - Carcinogenic by RTECS criteria. |
| **BARIUM NITRATE** | The material may produce moderate eye irritation leading to inflammation. |
| **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.<br>Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic<br>[*National Toxicology Program: U.S. Dep.*<br>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.<br>Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema.<br>Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. |
| **LITHIUM CARBONATE** | Goitrogenic:.<br>Lacrimation, altered sleep times, hallucinations, distorted perception, toxic psychosis, excitement, ataxia, respiratory depression, allergic dermatitis (after sytemic administration), foetoxicity and foetolethality and specific development abnormalities recorded. Non-sensitising guinea pig * * FMC SDS |
| **NICKEL** | Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen<br>[*National Toxicology Program: U.S. Dep.*<br>Oral (rat) TDLo: 500 mg/kg/5D-I Inhalation (rat) TCLo: 0.1 mg/m3/24H/17W-C |
| **URANIUM MIXED OXIDES (U3O8)** | Oral (rat) LD(?): > 4000 mg/kg Toxic effects not reported US NRCP Permissible quarterly intakes of radionuclides for occupational Insolubles- 3.2 microcuries per quarter oral intake; critical organ being the GI tract Lower large intestine. 4.0 x 10^-2 per quarter inhalation; critical organ being the lungs. Solubles- 1.2 microcuries per quarter oral intake; critical organ being the kidneys. 4.5 x 10^-2 per quarter inhalation; critical organ being the kidneys. |
| **YTTRIUM OXIDE** | Lanthanide poisoning causes immediate defaecation, writhing, inco-ordination, laboured breathing, and inactivity.<br>for typical lanthanides:<br>The symptoms of toxicity of the rare earth elements include writhing, ataxia, labored respiration, walking on the toes with arched back and sedation. |
| **NITRIC ACID** | for acid mists, aerosols, vapours<br>Data from assays for genotoxic activity in vitro suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5.<br>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. |

**Continued...**

| | |
|---|---|
| | Oral (?) LD50: 50-500 mg/kg * [Various Manufacturers] |
| **HYDROFLUORIC ACID** | (liver and kidney damage) [Manufacturer] for hydrogen fluoride (as vapour) |
| **ALUMINIUM & CHROMIUM & MOLYBDENUM & AMMONIUM PHOSPHATE, MONOBASIC & HYDROFLUORIC ACID & WATER** | No significant acute toxicological data identified in literature search. |
| **ARSENIC & BERYLLIUM ACETATE** | **WARNING:** This substance has been classified by the IARC as Group 1: **CARCINOGENIC TO HUMANS**. |
| **BARIUM NITRATE & 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. |
| **BERYLLIUM ACETATE & COBALT & NICKEL** | The following information refers to contact allergens as a group and may not be specific to this product. |
| **BERYLLIUM ACETATE & CALCIUM CARBONATE & LITHIUM CARBONATE & MANGANESE(II) ACETATE TETRAHYDRATE & AMMONIUM PHOSPHATE, MONOBASIC & AMMONIUM METAVANADATE & NITRIC ACID & HYDROFLUORIC ACID** | Asthma-like symptoms may continue for months or even years after exposure to the material ceases. |
| **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:<br>**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** | ✔ | **Carcinogenicity** | ⊘ |
| **Skin Irritation/Corrosion** | ✔ | **Reproductivity** | ⊘ |
| **Serious Eye Damage/Irritation** | ✔ | **STOT - Single Exposure** | ⊘ |
| **Respiratory or Skin sensitisation** | ⊘ | **STOT - Repeated Exposure** | ⊘ |
| **Mutagenicity** | ⊘ | **Aspiration Hazard** | ⊘ |

***Legend:*** ✘ *– Data available but does not fill the criteria for classification*
✔ *– Data required to make classification available*
⊘ *– Data Not Available to make classification*

## SECTION 12 ECOLOGICAL INFORMATION

### Toxicity

| Ingredient | Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|---|
| aluminium | LC50 | 96 | Fish | 0.078-0.108mg/L | 2 |
| aluminium | EC50 | 48 | Crustacea | 0.7364mg/L | 2 |
| aluminium | EC50 | 96 | Algae or other aquatic plants | 0.0054mg/L | 2 |
| aluminium | BCF | 360 | Algae or other aquatic plants | 9mg/L | 4 |
| aluminium | EC50 | 120 | Fish | 0.000051mg/L | 5 |
| aluminium | NOEC | 72 | Algae or other aquatic plants | >=0.004mg/L | 2 |
| arsenic | LC50 | 96 | Fish | 9.9mg/L | 4 |
| arsenic | EC50 | 336 | Algae or other aquatic plants | 0.63mg/L | 4 |
| arsenic | NOEC | 336 | Algae or other aquatic plants | <0.75mg/L | 4 |
| barium nitrate | LC50 | 96 | Fish | >3.5mg/L | 2 |
| barium nitrate | EC50 | 72 | Algae or other aquatic plants | >1.92mg/L | 2 |
| barium nitrate | EC50 | 72 | Algae or other aquatic plants | >34.31mg/L | 2 |
| barium nitrate | NOEC | 72 | Algae or other aquatic plants | >=1.92mg/L | 2 |
| boric acid | LC50 | 96 | Fish | 74mg/L | 2 |
| boric acid | EC50 | 48 | Crustacea | 133mg/L | 4 |
| boric acid | EC50 | 72 | Algae or other aquatic plants | 54mg/L | 2 |
| boric acid | EC50 | 72 | Algae or other aquatic plants | 66mg/L | 2 |
| boric acid | NOEC | 768 | Fish | 0.009mg/L | 2 |

**Continued...**

| | | | | | |
|---|---|---|---|---|---|
| **calcium carbonate** | LC50 | 96 | Fish | >56000mg/L | 4 |
| **calcium carbonate** | EC50 | 72 | Algae or other aquatic plants | >14mg/L | 2 |
| **calcium carbonate** | NOEC | 72 | Algae or other aquatic plants | 14mg/L | 2 |
| **cadmium** | LC50 | 96 | Fish | 0.001mg/L | 4 |
| **cadmium** | EC50 | 48 | Crustacea | 0.0033mg/L | 5 |
| **cadmium** | EC50 | 72 | Algae or other aquatic plants | 0.018mg/L | 2 |
| **cadmium** | BCF | 960 | Fish | 500mg/L | 4 |
| **cadmium** | EC50 | 336 | Crustacea | 0.00065mg/L | 5 |
| **cadmium** | NOEC | 168 | Fish | 0.00001821mg/L | 4 |
| **chromium** | LC50 | 96 | Fish | 13.9mg/L | 4 |
| **chromium** | EC50 | 48 | Crustacea | 0.0225mg/L | 5 |
| **chromium** | EC50 | 72 | Algae or other aquatic plants | 0.104mg/L | 4 |
| **chromium** | BCF | 1440 | Algae or other aquatic plants | 0.0495mg/L | 4 |
| **chromium** | EC50 | 48 | Crustacea | 0.0245mg/L | 5 |
| **chromium** | NOEC | 672 | Fish | 0.00019mg/L | 4 |
| **cobalt** | LC50 | 96 | Fish | 1.406mg/L | 2 |
| **cobalt** | EC50 | 48 | Crustacea | >0.89mg/L | 2 |
| **cobalt** | EC50 | 72 | Algae or other aquatic plants | 0.144mg/L | 2 |
| **cobalt** | BCF | 1344 | Fish | 0.99mg/L | 4 |
| **cobalt** | EC50 | 70 | Algae or other aquatic plants | 0.02mg/L | 2 |
| **cobalt** | NOEC | 168 | Algae or other aquatic plants | 0.0018mg/L | 2 |
| **iron** | LC50 | 96 | Fish | 0.05mg/L | 2 |
| **iron** | EC50 | 96 | Algae or other aquatic plants | 3.7mg/L | 4 |
| **iron** | BCF | 24 | Crustacea | 0.0000002mg/L | 4 |
| **iron** | EC50 | 504 | Crustacea | 4.49mg/L | 2 |
| **iron** | NOEC | 504 | Fish | 0.52mg/L | 2 |
| **lithium carbonate** | LC50 | 96 | Fish | 5.69mg/L | 2 |
| **lithium carbonate** | EC50 | 48 | Crustacea | 6.24mg/L | 2 |
| **lithium carbonate** | EC50 | 96 | Algae or other aquatic plants | 4630.937mg/L | 3 |
| **lithium carbonate** | EC50 | 48 | Crustacea | 33.2mg/L | 2 |
| **lithium carbonate** | NOEC | 816 | Fish | 2.87mg/L | 2 |
| **magnesium** | LC50 | 96 | Fish | 541mg/L | 2 |
| **magnesium** | EC50 | 72 | Algae or other aquatic plants | >20mg/L | 2 |
| **magnesium** | EC50 | 72 | Algae or other aquatic plants | >20mg/L | 2 |
| **magnesium** | NOEC | 72 | Algae or other aquatic plants | >25.5mg/L | 2 |
| **molybdenum** | LC50 | 96 | Fish | 609.1mg/L | 2 |
| **molybdenum** | EC50 | 72 | Algae or other aquatic plants | 289.2mg/L | 2 |
| **molybdenum** | BCF | 336 | Algae or other aquatic plants | 64mg/L | 4 |
| **molybdenum** | EC50 | 336 | Algae or other aquatic plants | 64mg/L | 4 |
| **molybdenum** | NOEC | 672 | Crustacea | 0.67mg/L | 2 |
| **nickel** | LC50 | 96 | Fish | 0.0000475mg/L | 4 |
| **nickel** | EC50 | 48 | Crustacea | 0.013mg/L | 5 |
| **nickel** | EC50 | 72 | Algae or other aquatic plants | 0.0407mg/L | 2 |
| **nickel** | BCF | 1440 | Algae or other aquatic plants | 0.47mg/L | 4 |
| **nickel** | EC50 | 720 | Crustacea | 0.0062mg/L | 2 |
| **nickel** | NOEC | 72 | Algae or other aquatic plants | 0.0035mg/L | 2 |
| **ammonium phosphate, monobasic** | LC50 | 96 | Fish | >85.9mg/L | 2 |
| **ammonium phosphate, monobasic** | EC50 | 72 | Algae or other aquatic plants | >97.1mg/L | 2 |
| **ammonium phosphate, monobasic** | EC50 | 72 | Algae or other aquatic plants | >97.1mg/L | 2 |
| **ammonium phosphate, monobasic** | NOEC | 72 | Algae or other aquatic plants | 3.57mg/L | 2 |
| **potassium nitrate** | LC50 | 96 | Fish | 22.5mg/L | 4 |
| **potassium nitrate** | EC50 | 96 | Algae or other aquatic plants | 1181.887mg/L | 3 |
| **potassium nitrate** | EC50 | 384 | Crustacea | 49.116mg/L | 3 |
| **selenium** | LC50 | 96 | Fish | >0.0262mg/L | 2 |
| **selenium** | EC50 | 48 | Crustacea | >0.1603mg/L | 2 |
| **selenium** | EC50 | 72 | Algae or other aquatic plants | >0.00173mg/L | 2 |

**Continued...**

| | | | | | |
|---|---|---|---|---|---|
| **selenium** | BCF | 504 | Crustacea | 0.711mg/L | 4 |
| **selenium** | EC50 | 96 | Algae or other aquatic plants | 0.355mg/L | 2 |
| **selenium** | NOEC | 72 | Algae or other aquatic plants | 0.000547mg/L | 2 |
| **ammonium metavanadate** | LC50 | 96 | Fish | 0.693mg/L | 2 |
| **ammonium metavanadate** | EC50 | 48 | Crustacea | 2.387mg/L | 2 |
| **ammonium metavanadate** | EC50 | 72 | Algae or other aquatic plants | 0.9894mg/L | 2 |
| **ammonium metavanadate** | EC50 | 72 | Algae or other aquatic plants | 1.162mg/L | 2 |
| **ammonium metavanadate** | NOEC | 72 | Algae or other aquatic plants | 0.0168mg/L | 2 |
| **zinc** | LC50 | 96 | Fish | 0.00272mg/L | 4 |
| **zinc** | EC50 | 48 | Crustacea | 0.04mg/L | 5 |
| **zinc** | EC50 | 72 | Algae or other aquatic plants | 0.106mg/L | 4 |
| **zinc** | BCF | 360 | Algae or other aquatic plants | 9mg/L | 4 |
| **zinc** | EC50 | 120 | Fish | 0.00033mg/L | 5 |
| **zinc** | NOEC | 336 | Algae or other aquatic plants | 0.00075mg/L | 4 |
| **nitric acid** | NOEC | 16 | Crustacea | 107mg/L | 4 |
| **hydrofluoric acid** | LC50 | 96 | Fish | 51mg/L | 2 |
| **hydrofluoric acid** | EC50 | 48 | Crustacea | =270mg/L | 1 |
| **hydrofluoric acid** | EC50 | 96 | Crustacea | 26-48mg/L | 2 |
| **hydrofluoric acid** | NOEC | 504 | Fish | 4mg/L | 2 |
| ***Legend:*** | *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 - 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 Fluorides: Small amounts of fluoride have beneficial effects however; excessive intake over long periods may cause dental and/or skeletal fluorosis.
For Molybdenum:
Environmental Fate: Molybdenum is an essential micronutrient in plants and animals.
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.
For Lanthanoids (Formerly Lanthanides: Synonym Rare Earth Metals and their Salts):
Environmental Fate: Rare earths, such as the lanthanoids, are relatively abundant in the crust of the Earth.
for Boron and Borates:
Environmental Fate - Boron is generally found in nature bound to oxygen and is never found as the free element.
**Ecotoxicity:**
The tolerance of water organisms towards pH margin and variation is diverse.
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 |
|---|---|---|
| boric acid | LOW | LOW |
| lithium carbonate | LOW | LOW |
| ammonium phosphate, monobasic | HIGH | HIGH |
| potassium nitrate | LOW | LOW |
| ammonium metavanadate | HIGH | HIGH |
| water | LOW | LOW |

### Bioaccumulative potential

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

### Mobility in soil

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

**Continued...**

| | |
|---|---|
| water | LOW (KOC = 14.3) |

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

| | |
|---|---|
| **Product / Packaging disposal** | ▸ Containers may still present a chemical hazard/ danger when empty.<br>▸ Recycle wherever possible. |

## 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 and hydrofluoric acid) |
| **Transport hazard class(es)** | Class: 8<br>Subrisk: Not Applicable |
| **Packing group** | II |
| **Environmental hazard** | Not Applicable |
| **Special precautions for user** | Hazard Label: 8<br>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 and hydrofluoric acid) |
| **Transport hazard class(es)** | ICAO/IATA Class: 8<br>ICAO / IATA Subrisk: Not Applicable<br>ERG Code: 8L |
| **Packing group** | II |
| **Environmental hazard** | Not Applicable |
| **Special precautions for user** | Special provisions: A3A803<br>Cargo Only Packing Instructions: 855<br>Cargo Only Maximum Qty / Pack: 30 L<br>Passenger and Cargo Packing Instructions: 851<br>Passenger and Cargo Maximum Qty / Pack: 1 L<br>Passenger and Cargo Limited Quantity Packing Instructions: Y840<br>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 and hydrofluoric acid) |
| **Transport hazard class(es)** | IMDG Class: 8<br>IMDG Subrisk: Not Applicable |
| **Packing group** | II |
| **Environmental hazard** | Not Applicable |
| **Special precautions for user** | EMS Number: F-A, S-B |

**Continued...**

| | |
|---|---|
| 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 - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US 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 (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
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 EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 13th 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 NITRATE(10022-31-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US 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

**BERYLLIUM ACETATE(543-81-7) 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 (CRELs)
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 EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 13th 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**

**Continued...**

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

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - California Proposition 65 - Carcinogens
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens
US - California Proposition 65 - Reproductive Toxicity
US - Hawaii Air Contaminant Limits
US - Idaho - Acceptable Maximum Peak Concentrations
US - Idaho - Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens
US - Oregon Permissible Exposure Limits (Z-1)
US - Oregon Permissible Exposure Limits (Z-2)
US - 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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US EPA Carcinogens Listing
US EPCRA Section 313 Chemical List
US National Toxicology Program (NTP) 13th Report Part A Known to be Human Carcinogens
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Carcinogens Listing
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - Alaska Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US 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

**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 - Alaska Limits for Air Contaminants
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 - 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 - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ACGIH Threshold Limit Values (TLV)
US ACGIH Threshold Limit Values (TLV) - Carcinogens
US 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 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

**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)
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

**Continued...**

**LITHIUM CARBONATE(554-13-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

US - California Proposition 65 - Reproductive Toxicity
US EPCRA Section 313 Chemical 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 Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

**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 - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US OSHA Permissible Exposure Levels (PELs) - Table Z3
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 - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
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 EPCRA Section 313 Chemical List
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

**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 - Minnesota Permissible Exposure Limits (PELs)
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 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

**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 - 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 - 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 National Toxicology Program (NTP) 13th Report Part B.
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

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

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

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

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - Hawaii Air Contaminant Limits
US - Idaho - Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Oregon Permissible Exposure Limits (Z-2)
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift
US OSHA Permissible Exposure Levels (PELs) - Table Z1
US OSHA Permissible Exposure Levels (PELs) - Table Z2
US OSHA Permissible Exposure Levels (PELs) - Table Z3
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

**Continued...**

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 - Minnesota Permissible Exposure Limits (PELs)
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 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

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

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

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

US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

**YTTRIUM OXIDE(11130-29-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

US - California Permissible Exposure Limits for Chemical Contaminants
US ACGIH Threshold Limit Values (TLV)
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 - Michigan Exposure Limits for Air Contaminants
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
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 - Michigan Exposure Limits for Air Contaminants
US - Minnesota Permissible Exposure Limits (PELs)
US - Oregon Permissible Exposure Limits (Z-1)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Washington Permissible exposure limits of air contaminants
US - 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 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 - Alaska Limits for Air Contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)
US - California Permissible Exposure Limits for Chemical Contaminants
US - Hawaii Air Contaminant Limits
US - Idaho - 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 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 OSHA Permissible Exposure Levels (PELs) - Table Z2
US SARA Section 302 Extremely Hazardous Substances
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

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

**Continued...**

### 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 |
| Nickel | 100 | 45.4 |
| Ammonium silicofluoride | 1000 | 454 |
| Selenium | 100 | 45.4 |
| 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, Lithium carbonate, Nickel (Metallic) Listed

| National Inventory | Status |
|---|---|
| Australia - AICS | N (yttrium oxide; beryllium acetate) |
| Canada - DSL | N (yttrium oxide; uranium mixed oxides (U3O8); beryllium acetate) |
| Canada - NDSL | N (zinc; lithium carbonate; ammonium metavanadate; barium nitrate; magnesium; ammonium phosphate, monobasic; water; ammonium fluorosilicate; selenium; aluminium; molybdenum; arsenic; cobalt; nickel; manganese(II) acetate tetrahydrate; boric acid; iron; chromium; potassium nitrate; hydrofluoric acid; beryllium acetate; cadmium; nitric acid) |
| China - IECSC | N (uranium mixed oxides (U3O8); beryllium acetate) |
| Europe - EINEC / ELINCS / NLP | Y |
| Japan - ENCS | N (zinc; magnesium; water; selenium; aluminium; molybdenum; arsenic; cobalt; nickel; iron; chromium; uranium mixed oxides (U3O8); beryllium acetate; cadmium) |
| Korea - KECI | N (uranium mixed oxides (U3O8); beryllium acetate) |
| New Zealand - NZIoC | N (yttrium oxide; uranium mixed oxides (U3O8); beryllium acetate) |
| Philippines - PICCS | N (yttrium oxide; uranium mixed oxides (U3O8); beryllium acetate) |
| USA - TSCA | N (beryllium acetate) |
| ***Legend:*** | *Y = All ingredients are on the inventory*<br>*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 nitrate | 10022-31-8, 34053-87-7 |
| 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 |
| ammonium fluorosilicate | 16919-19-0, 1309-32-6 |
| 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.

**Continued...**

## 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