Calib. Std #5 Fluoride Soluble Elements

Novachem Pty Ltd

Version No: **1.1**
Safety Data Sheet according to WHS and ADG requirements

Chemwatch Hazard Alert Code: **3**

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SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	Calib. Std #5 Fluoride Soluble Elements
Synonyms	MISA-05-1
Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (contains nitric acid)
Other means of identification	Not Available
CAS number	Not Available

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

Relevant identified uses	Laboratory Chemical Reference Material

Details of the supplier of the safety data sheet

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

Emergency telephone number

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

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Flammable Liquid Category 2, Metal Corrosion Category 1, Acute Toxicity (Oral) Category 4, Acute Toxicity (Dermal) Category 4, Skin Corrosion/Irritation Category 1B, Serious Eye Damage Category 1
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HSIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

Label elements

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

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.

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Precautionary statement(s) Prevention

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233	Keep container tightly closed.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary statement(s) Disposal

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

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

CAS No	%[weight]	Name
7732-18-5	94.605	water
7440-36-0	0.01	antimony
10043-35-3	0.057	boric acid
16962-47-3	0.031	ammonium hexafluorogermanate(IV)
12055-23-1	0.012	hafnium oxide
12054-85-2	0.018	ammonium molybdate
1313-96-8	0.014	niobium(V) oxide
7722-76-1	0.037	ammonium phosphate, monobasic
7440-15-5	0.01	rhenium
16919-19-0	0.063	ammonium fluorosilicate
7783-20-2	0.041	ammonium sulfate
7440-25-7	0.01	tantalum
7440-31-5	0.01	tin
16962-40-6	0.041	ammonium hexafluorotitanate(IV)
11120-25-5	0.015	ammonium tungstate
13826-66-9	0.025	zirconyl nitrate
7697-37-2	5	nitric acid
7664-39-3	0.001	hydrofluoric acid

Mixtures

See section above for composition of Substances

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Immediately hold eyelids apart and flush the eye continuously with running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▸ Transport to hospital or doctor without delay. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▸ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▸ Quickly remove all contaminated clothing, including footwear. ▸ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▸ Transport to hospital, or doctor.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if

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	▸ necessary. ▸ Transport to hospital, or doctor, without delay.
Ingestion	▸ For advice, contact a Poisons Information Centre or a doctor at once. ▸ Urgent hospital treatment is likely to be needed. ▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Transport to hospital or doctor without delay.

Indication of any immediate medical attention and special treatment needed

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

BIOLOGICAL EXPOSURE INDEX - BEI

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

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

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

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

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

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 FIREFIGHTING MEASURES

Extinguishing media

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

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Fight fire from a safe distance, with adequate cover. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves in the event of a fire. ▸ Prevent, by any means available, spillage from entering drains or water courses. ▸ Use fire fighting procedures suitable for surrounding area.

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Fire/Explosion Hazard	▸ Liquid and vapour are highly flammable. ▸ Severe fire hazard when exposed to heat, flame and/or oxidisers. ▸ Vapour may travel a considerable distance to source of ignition. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. Combustion products include: carbon dioxide (CO_2) hydrogen fluoride other pyrolysis products typical of burning organic material.
HAZCHEM	2X

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	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear full body protective clothing with breathing apparatus. ▸ Prevent, by any means available, spillage from entering drains or water course.

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

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	▸ Containers, even those that have been emptied, may contain explosive vapours. ▸ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers in approved flame-proof area. ▸ No smoking, naked lights, heat or ignition sources. ▸ **DO NOT** store in pits, depressions, basements or areas where vapours may be trapped. ▸ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ **DO NOT** use aluminium or galvanised containers ▸ Packing as supplied by manufacturer. ▸ Plastic containers may only be used if approved for flammable liquid. ▸ Check that containers are clearly labelled and free from leaks. ▸ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure. ▸ For materials with a viscosity of at least 2680 cSt. (23 deg. C) ▸ For manufactured product having a viscosity of at least 250 cSt. ▸ Material is corrosive to most metals, glass and other siliceous materials.
Storage incompatibility	Salts of inorganic fluoride: ▸ react with water forming acidic solutions. ▸ are violent reactive with boron, bromine pentafluoride,bromine trifluoride, calcium disilicide, calcium hydride, oxygen difluoride, platinum, potassium. ▸ in aqueous solutions are incompatible with sulfuric acid, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, isocyanates, nitromethane, organic anhydrides, vinyl acetate. ▸ corrode metals in presence of moisture ▸ may be incompatible with glass and porcelain ▸ WARNING: Avoid or control reaction with peroxides. All *transition metal* peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively. ▸ The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive. ▸ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air. Hydrogen fluoride: ▸ reacts violently with strong oxidisers, acetic anhydride, alkalis, 2-aminoethanol, arsenic trioxide (with generation of heat), bismuthic acid, calcium oxide, chlorosulfonic acid, cyanogen fluoride, ethylenediamine, ethyleneimine, fluorine (fluorine gas reacts vigorously with a 50% hydrofluoric acid solution and may burst into flame), nitrogen trifluoride, N-phenylazopiperidine, oleum, oxygen difluoride, phosphorus pentoxide, potassium permanganate, potassium tetrafluorosilicate(2-), beta-propiolactone, propylene oxide, sodium, sodium tetrafluorosilicate, sulfuric acid, vinyl acetate ▸ reacts (possibly violently) with aliphatic amines, alcohols, alkanolamines, alkylene oxides, aromatic amines, amides, ammonia, ammonium hydroxide, epichlorohydrin, isocyanates, metal acetylides, metal silicides, methanesulfonic acid, nitrogen compounds, organic anhydrides, oxides, silicon compounds, vinylidene fluoride ▸ attacks glass and siliceous materials, concrete, ceramics, metals (flammable hydrogen gas may be produced), metal alloys, some plastics, rubber

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- coatings, leather, and most other materials with the exception of lead, platinum, polyethylene, wax.
- Avoid strong bases.
- Avoid reaction with oxidising agents

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	antimony	Antimony & compounds (as Sb)	0.5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	ammonium molybdate	Molybdenum, soluble compounds (as Mo)	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	tantalum	Tantalum, metal & oxide dusts	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	tin	Tin, metal	2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	zirconyl nitrate	Zirconium compounds (as Zr)	5 mg/m3	10 mg/m3	Not Available	Not Available
Australia Exposure Standards	nitric acid	Nitric acid	2 ppm / 5.2 mg/m3	10 mg/m3 / 4 ppm	Not Available	Not Available
Australia Exposure Standards	hydrofluoric acid	Hydrogen fluoride (as F)	Not Available	Not Available	3 ppm / 2.6 mg/m3	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
antimony	Antimony	1.5 mg/m3	13 mg/m3	80 mg/m3
boric acid	Boric acid	6 mg/m3	23 mg/m3	830 mg/m3
hafnium oxide	Hafnium oxide	1.8 mg/m3	19 mg/m3	120 mg/m3
ammonium molybdate	Molybdic acid, hexaammonium salt; (Ammonium heptamolybdate)	2.6 mg/m3	230 mg/m3	1,400 mg/m3
ammonium molybdate	Ammonium molybdate(VI) tetrahydrate	2.8 mg/m3	30 mg/m3	180 mg/m3
ammonium molybdate	Ammonium molybdate; (Diammonium molybdate)	3.1 mg/m3	22 mg/m3	130 mg/m3
niobium(V) oxide	Niobium pentoxide; (Niobium(V) oxide)	6.6 mg/m3	72 mg/m3	430 mg/m3
ammonium phosphate, monobasic	Ammonium dihydrogen phosphate; (Monoammonium phosphate)	17 mg/m3	190 mg/m3	1,100 mg/m3
ammonium fluorosilicate	Ammonium hexafluorosilicate; (Ammonium silicofluoride)	12 mg/m3	130 mg/m3	780 mg/m3
ammonium sulfate	Ammonium sulfate	13 mg/m3	140 mg/m3	840 mg/m3
tantalum	Tantalum	10 mg/m3	11 mg/m3	64 mg/m3
tin	Tin	6 mg/m3	67 mg/m3	400 mg/m3
ammonium hexafluorotitanate(IV)	Titanium-based alloy; (Titanium compounds)	30 mg/m3	330 mg/m3	2,000 mg/m3
ammonium tungstate	Ammonium tungstate(VI)	4.1 mg/m3	45 mg/m3	270 mg/m3
zirconyl nitrate	Zirconyl nitrate; (Bis(nitrato-O)oxozirconium)	25 mg/m3	220 mg/m3	1,300 mg/m3
zirconyl nitrate	Zirconium oxynitrate hydrate	27 mg/m3	230 mg/m3	1,400 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
water	Not Available	Not Available
antimony	Not Available	Not Available
boric acid	Not Available	Not Available
ammonium hexafluorogermanate(IV)	Not Available	Not Available
hafnium oxide	50 mg/m3	Not Available
ammonium molybdate	1,000 mg/m3	Not Available
niobium(V) oxide	Not Available	Not Available
ammonium phosphate, monobasic	Not Available	Not Available
rhenium	Not Available	Not Available
ammonium fluorosilicate	Not Available	Not Available
ammonium sulfate	Not Available	Not Available
tantalum	2,500 mg/m3	Not Available
tin	Not Available	Not Available
ammonium hexafluorotitanate(IV)	Not Available	Not Available
ammonium tungstate	Not Available	Not Available
zirconyl nitrate	25 mg/m3	Not Available
nitric acid	25 ppm	Not Available
hydrofluoric acid	30 ppm	Not Available

Exposure controls

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Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Chemical goggles. ▸ Full face shield may be required for supplementary but never for primary protection of eyes. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber ▸ 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. ▸ PVC Apron. ▸ PVC protective suit may be required if exposure severe. ▸ Eyewash unit. ▸ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity. ▸ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets). ▸ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
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Material	CPI
NEOPRENE	A
BUTYL	C
BUTYL/NEOPRENE	C
HYPALON	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
VITON	C
VITON/NEOPRENE	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Not Available

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Physical state	Liquid	**Relative density (Water = 1)**	1.02
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Applicable
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	83	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Noncombustible	**Taste**	Not Available
Evaporation rate	Slow Not Available	**Explosive properties**	Not Available
Flammability	Noncombustible	**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)**	100
Vapour pressure (kPa)	2.42	**Gas group**	Not Available
Solubility in water (g/L)	Miscible	**pH as a solution (1%)**	<2
Vapour density (Air = 1)	0.62 g/L	**VOC g/L**	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Not normally a hazard due to non-volatile nature of product Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Acute effects of fluoride inhalation include irritation of nose and throat, coughing and chest discomfort. A single acute over-exposure may even cause nose bleed.
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. The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident. Fluoride causes severe loss of calcium in the blood, with symptoms appearing several hours later including painful and rigid muscle contractions of the limbs. Cardiovascular collapse can occur and may cause death with increased heart rate and other heart rhythm irregularities. Ingestion or skin absorption of boric acid causes nausea, abdominal pain, diarrhoea and profuse vomiting which may be blood stained, headache, weakness, reddened lesions on the skin. In severe cases, it may cause shock, with fall in blood pressure, increase in heart rate, blue skin colour, brain and nervous irritation, reduced urine volume or even absence of urine. Borate poisoning causes nausea, vomiting, diarrhoea and pain in the upper abdomen. Often persistent vomiting occurs, and there may be blood in the faeces.
Skin Contact	Skin contact with the material may be harmful; systemic effects may result following absorption. The material can produce chemical burns following direct contact with the skin. 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. Boric acid is not absorbed via intact skin but absorbed on broken or inflamed skin. Fluorides are easily absorbed through the skin and cause death of soft tissue and erode bone. Healing is delayed and death of tissue may continue to spread beneath skin. Contact of the skin with liquid hydrofluoric acid (hydrogen fluoride) may cause severe burns, erythema, and swelling, vesiculation, and serious crusting. With more serious burns, ulceration, blue-gray discoloration, and necrosis may occur. Solutions of hydrofluoric acid, as dilute as 2%, may cause severe skin burns. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. If applied to the eyes, this material causes severe eye damage. Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely. Animal testing showed that a 20% solution of hydrofluoric acid (hydrogen fluoride) in water caused immediate damage in the form of total clouding of the lens and ischaemia of the conjunctiva. Swelling of the stroma of the cornea occurred within 1 hour, followed by tissue death (necrosis) of structures of the front of the eye.

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Chronic	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Chronic boric acid poisoning is characterized by mild gastrointestinal irritation, loss of appetite, disturbed digestion, nausea, possibly vomiting and a hard irregular and discoloured rash. Dryness of skin, reddening of tongue, loss of hair, inflammation of conjunctiva, and kidney injury have also been reported. Borate can accumulate in the testes and deplete germ cells and cause withering of the testicles, according to animal testing. Hair loss, skin inflammation, stomach ulcer and anaemia can all occur. 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. There may also be frequent urination and thirst. Hydrogen fluoride easily penetrates the skin and causes destruction and corrosion of the bone and underlying tissue. Ingestion causes severe pains and burns in the mouth and throat and blood calcium levels are dangerously reduced.

Calib. Std #5 Fluoride Soluble Elements	
TOXICITY	**IRRITATION**
Not Available	Not Available

water	
TOXICITY	**IRRITATION**
Not Available	Not Available

antimony	
TOXICITY	**IRRITATION**
Dermal (rabbit) LD50: >8300 mg/kg[1]	Not Available
Oral (rat) LD50: 100 mg/kg[2]	

boric acid	
TOXICITY	**IRRITATION**
Oral (rat) LD50: 2500 mg/kg[2]	Skin (human): 15 mg/3d -I- mild

ammonium hexafluorogermanate(IV)	
TOXICITY	**IRRITATION**
Not Available	Not Available

hafnium oxide	
TOXICITY	**IRRITATION**
Not Available	Not Available

ammonium molybdate	
TOXICITY	**IRRITATION**
Oral (rat) LD50: 333 mg/kg[2]	Not Available

niobium(V) oxide	
TOXICITY	**IRRITATION**
dermal (rat) LD50: >2000 mg/kg[1]	Not Available
Oral (rat) LD50: 5000 mg/kg[1]	

ammonium phosphate, monobasic	
TOXICITY	**IRRITATION**
dermal (rat) LD50: >5000 mg/kg[1]	Not Available
Oral (rat) LD50: >2000 mg/kg[1]	

rhenium	
TOXICITY	**IRRITATION**
Not Available	Not Available

ammonium fluorosilicate	
TOXICITY	**IRRITATION**
Oral (mouse) LD50: 70 mg/kg[2]	Not Available

ammonium sulfate	
TOXICITY	**IRRITATION**
dermal (rat) LD50: >2000 mg/kg[1]	Not Available
Oral (rat) LD50: >2000 mg/kg[1]	

tantalum	
TOXICITY	**IRRITATION**
Oral (mouse) LD50: 595 mg/kg[2]	Not Available

Continued...

tin	**TOXICITY** / **IRRITATION** dermal (rat) LD50: >2000 mg/kg[1] / Not Available Oral (rat) LD50: >2000 mg/kg[1] /
ammonium hexafluorotitanate(IV)	**TOXICITY** / **IRRITATION** Not Available / Not Available
ammonium tungstate	**TOXICITY** / **IRRITATION** dermal (rat) LD50: >2000 mg/kg[1] / Not Available Oral (rat) LD50: >2000 mg/kg[1] /
zirconyl nitrate	**TOXICITY** / **IRRITATION** Oral (rat) LD50: 2500 mg/kg[2] / Not Available
nitric acid	**TOXICITY** / **IRRITATION** 50-500 mg/kg[2] / Not Available Inhalation (rat) LC50: 0.13 mg/l/4h[2] /
hydrofluoric acid	**TOXICITY** / **IRRITATION** Inhalation (rat) LC50: 0.275 mg/l/60M[2] / Eye (human): 50 mg - SEVERE
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*

BORIC ACID	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.
AMMONIUM MOLYBDATE	The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. For ammonium dimolybdate: (CAS 27546-07-2) Positive reaction in 20% of experimental animals (OECD 406; GPMT according to Magnusoon-Kligman
AMMONIUM SULFATE	For ammonium sulfate: Acute toxicity: Ammonium sulfate has relatively low acute toxicity. In healthy humans, inhaling high concentrations caused mild reduction in lung function. Animal testing has not shown ammonium sulfate to cause irritation to the skin and eyes. There is no available data on sensitization.
AMMONIUM TUNGSTATE	Tungsten can cause a reduction in body temperature, and enlargement of the adrenal glands and kidneys if injected. Death may occur if it is given directly into the abdominal cavity.
NITRIC ACID	For acid mists, aerosols, vapours Test results suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airway from direct exposure to inhaled acidic mists (which also protects the stomach lining from the hydrochloric acid secreted there). The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration. Oral (?) LD50: 50-500 mg/kg * [Various Manufacturers]
HYDROFLUORIC ACID	(liver and kidney damage) [Manufacturer] for hydrogen fluoride (as vapour)
Calib. Std #5 Fluoride Soluble Elements & AMMONIUM HEXAFLUOROGERMANATE(IV) & AMMONIUM MOLYBDATE & NIOBIUM(V) OXIDE & AMMONIUM PHOSPHATE, MONOBASIC & AMMONIUM SULFATE & TANTALUM & AMMONIUM HEXAFLUOROTITANATE(IV) & AMMONIUM TUNGSTATE & ZIRCONYL NITRATE & NITRIC ACID & HYDROFLUORIC ACID	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia.
WATER & AMMONIUM HEXAFLUOROGERMANATE(IV) & HAFNIUM OXIDE & NIOBIUM(V) OXIDE & AMMONIUM PHOSPHATE, MONOBASIC & RHENIUM & TIN & AMMONIUM TUNGSTATE & HYDROFLUORIC ACID	No significant acute toxicological data identified in literature search.

Continued...

NITRIC ACID & HYDROFLUORIC ACID	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. 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 available to make classification*
⊘ *– Data Not Available to make classification*

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Calib. Std #5 Fluoride Soluble Elements

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

water

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

antimony

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.93mg/L	2
EC50	48	Crustacea	1mg/L	2
EC50	72	Algae or other aquatic plants	>2.4mg/L	2
NOEC	720	Fish	>0.0075mg/L	2

boric acid

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

ammonium hexafluorogermanate(IV)

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

hafnium oxide

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

ammonium molybdate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	373mg/L	6
EC50	72	Algae or other aquatic plants	289.2mg/L	2
NOEC	672	Crustacea	0.67mg/L	2

niobium(V) oxide

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

ammonium phosphate, monobasic

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	>85.9mg/L	2
EC50	72	Algae or other aquatic plants	>97.1mg/L	2
NOEC	72	Algae or other aquatic plants	3.57mg/L	2

rhenium

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

Continued...

ammonium fluorosilicate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

ammonium sulfate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	0.068mg/L	4
EC50	48	Crustacea	121.7mg/L	2
NOEC	216	Fish	0.064mg/L	4

tantalum

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

tin

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	>0.0124mg/L	2
EC50	48	Crustacea	0.00018mg/L	5
EC50	72	Algae or other aquatic plants	>0.0192mg/L	2
NOEC	168	Crustacea	<0.005mg/L	2

ammonium hexafluorotitanate(IV)

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

ammonium tungstate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	>181mg/L	2
EC50	48	Crustacea	>163mg/L	2
EC50	72	Algae or other aquatic plants	7.35mg/L	2
NOEC	72	Algae or other aquatic plants	0.812mg/L	2

zirconyl nitrate

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
Not Available	Not Available	Not Available	Not Available	Not Available

nitric acid

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
NOEC	16	Crustacea	107mg/L	4

hydrofluoric acid

ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
LC50	96	Fish	51mg/L	2
EC50	48	Crustacea	=270mg/L	1
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 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

For Fluorides: Small amounts of fluoride have beneficial effects however; excessive intake over long periods may cause dental and/or skeletal fluorosis. Fluorides are absorbed by humans following inhalation of workplace and ambient air that has been contaminated, ingestion of drinking water and foods and dermal contact. Populations living in areas with high fluoride levels in groundwater may be exposed to higher levels of fluorides in their drinking water or in beverages prepared with the water. Among these populations, outdoor labourers, people living in hot climates, and people with excessive thirst will generally have the greatest daily intake of fluorides because they consume greater amounts of water.
for Boron and Borates:
Environmental Fate - Boron is generally found in nature bound to oxygen and is never found as the free element. As an element, boron itself cannot be degraded in the environment, however; it may undergo various reactions that change the form of boron (e.g., precipitation, polymerization, and acid-base reactions) depending on conditions such as its concentration in water and pH. As boron is a natural component of the environment, individuals will have some exposure from foods and drinking water.
Atmospheric Fate: Atmospheric boron may be in the form of particulate matter or aerosols as borides, boron oxides, borates, borates, organoboron compounds, trihalide boron compounds, or borazines.
Ecotoxicity:
The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5
DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW
boric acid	LOW	LOW
hafnium oxide	HIGH	HIGH

Continued...

ammonium phosphate, monobasic	HIGH	HIGH
ammonium sulfate	HIGH	HIGH
zirconyl nitrate	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
water	LOW (LogKOW = -1.38)
boric acid	LOW (BCF = 0)
hafnium oxide	LOW (LogKOW = 2.229)
ammonium molybdate	LOW (BCF = 5.7)
ammonium phosphate, monobasic	LOW (LogKOW = -0.7699)
ammonium sulfate	LOW (LogKOW = -2.2002)
zirconyl nitrate	LOW (LogKOW = 1.389)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)
boric acid	LOW (KOC = 35.04)
hafnium oxide	LOW (KOC = 23.74)
ammonium phosphate, monobasic	HIGH (KOC = 1)
ammonium sulfate	LOW (KOC = 6.124)
zirconyl nitrate	LOW (KOC = 35.04)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▸ Containers may still present a chemical hazard/ danger when empty. ▸ Return to supplier for reuse/ recycling if possible. Otherwise: ▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product. For small quantities: ▸ Cautiously dissolve in water ▸ Neutralise with sodium carbonate or if product does not dissolve completely add a small quantity of hydrochloric acid followed by sodium carbonate ▸ Add excess calcium chloride to precipitate the fluoride and/ or carbonate ▸ Remove solids to site approved for hazardous waste ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus ▸ Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	2X

Land transport (ADG)

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

Continued...

Air transport (ICAO-IATA / DGR)

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

Sea transport (IMDG-Code / GGVSee)

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

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

Not Applicable

SECTION 15 REGULATORY INFORMATION

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

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

Australia Inventory of Chemical Substances (AICS)

ANTIMONY(7440-36-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards
Australia Hazardous chemicals which may require Health Monitoring
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Part 2, Section Seven - Appendix I
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

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

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4

AMMONIUM HEXAFLUOROGERMANATE(IV)(16962-47-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

HAFNIUM OXIDE(12055-23-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

AMMONIUM MOLYBDATE(12054-85-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards
Australia Inventory of Chemical Substances (AICS)

NIOBIUM(V) OXIDE(1313-96-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

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

Australia Inventory of Chemical Substances (AICS)

RHENIUM(7440-15-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Continued...

Australia Inventory of Chemical Substances (AICS)

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

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

AMMONIUM SULFATE(7783-20-2) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

TANTALUM(7440-25-7) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards
Australia Inventory of Chemical Substances (AICS)

TIN(7440-31-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards
Australia Inventory of Chemical Substances (AICS)

AMMONIUM HEXAFLUOROTITANATE(IV)(16962-40-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

AMMONIUM TUNGSTATE(11120-25-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Inventory of Chemical Substances (AICS)

ZIRCONYL NITRATE(13826-66-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Australia Exposure Standards

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

Australia Exposure Standards
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

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

Australia Exposure Standards
Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Inventory of Chemical Substances (AICS)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix F (Part 3)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Appendix J (Part 2)
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 2
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 3
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 7
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

National Inventory Status

National Inventory	Status
Australia - AICS	N (ammonium hexafluorotitanate(IV); ammonium hexafluorogermanate(IV); hafnium oxide; zirconyl nitrate)
Canada - DSL	N (ammonium hexafluorotitanate(IV); ammonium hexafluorogermanate(IV); ammonium tungstate)
Canada - NDSL	N (ammonium molybdate; ammonium hexafluorogermanate(IV); water; ammonium phosphate, monobasic; antimony; ammonium fluorosilicate; ammonium sulfate; niobium(V) oxide; rhenium; tantalum; hafnium oxide; boric acid; tin; zirconyl nitrate; hydrofluoric acid; nitric acid)
China - IECSC	N (ammonium hexafluorogermanate(IV))
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (ammonium hexafluorogermanate(IV); antimony; rhenium; tantalum; tin)
Korea - KECI	N (ammonium hexafluorogermanate(IV))
New Zealand - NZIoC	N (ammonium hexafluorogermanate(IV); zirconyl nitrate; ammonium tungstate)
Philippines - PICCS	N (ammonium hexafluorotitanate(IV); ammonium hexafluorogermanate(IV); niobium(V) oxide; hafnium oxide; zirconyl nitrate; ammonium tungstate)
USA - TSCA	N (ammonium hexafluorogermanate(IV))
Legend:	*Y = All ingredients are on the inventory* *N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 OTHER INFORMATION

Revision Date	30/08/2018
Initial Date	30/08/2018

Other information

Ingredients with multiple cas numbers

Name	CAS No

Continued...

boric acid	10043-35-3, 11113-50-1, 41685-84-1
ammonium molybdate	13106-76-8, 12054-85-2, 140899-16-7
niobium(V) oxide	1313-96-8, 144439-99-6
ammonium fluorosilicate	16919-19-0, 1309-32-6
ammonium tungstate	11120-25-5, 11140-77-5
zirconyl nitrate	13826-66-9, 14985-18-3, 20213-65-4
hydrofluoric acid	7664-39-3, 790596-14-4

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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