

## ICP Analytical Mixture 5

### High-Purity Standards

Catalogue number: ICP-AM-5  
Version No: 1.1  
Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 05/20/2017  
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S.GHS.USA.EN

## SECTION 1 IDENTIFICATION

### Product Identifier

Product name	ICP Analytical Mixture 5
Synonyms	ICP-AM-5
Proper shipping name	Hydrochloric acid
Other means of identification	ICP-AM-5

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

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

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

### Emergency phone number


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

## SECTION 2 HAZARD(S) IDENTIFICATION

### Classification of the substance or mixture

Classification	Metal Corrosion Category 1, Skin Corrosion/Irritation Category 1A, Serious Eye Damage Category 1
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### Label elements

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

### Hazard statement(s)

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

### Hazard(s) not otherwise specified

Not Applicable

### Precautionary statement(s) Prevention

ICP Analytical Mixture 5

**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	<u>aluminium</u>
7440-38-2	0.01	<u>arsenic</u>
7440-39-3	0.01	<u>barium</u>
543-81-7	0.01	<u>beryllium acetate</u>
7440-43-9	0.01	<u>cadmium</u>
7440-47-3	0.01	<u>chromium</u>
7440-48-4	0.01	<u>cobalt</u>
7440-50-8	0.01	<u>copper</u>
7439-89-6	0.01	<u>iron</u>
7439-92-1	0.01	<u>lead</u>
6156-78-1	0.01	<u>manganese(II) acetate tetrahydrate</u>
7440-02-0	0.01	<u>nickel</u>
7440-66-6	0.01	<u>zinc</u>
7647-01-0	5	<u>hydrochloric acid</u>
7732-18-5	Balance	<u>water</u>

**SECTION 4 FIRST-AID MEASURES**

**Description of first aid measures**

<b>Eye Contact</b>	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Immediately hold eyelids apart and flush the eye continuously with running water.</li> <li>▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.</li> <li>▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.</li> <li>▶ Transport to hospital or doctor without delay.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately flush body and clothes with large amounts of water, using safety shower if available.</li> <li>▶ Quickly remove all contaminated clothing, including footwear.</li> <li>▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.</li> <li>▶ Transport to hospital, or doctor.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> <li>▶ Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.</li> <li>▶ Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).</li> <li>▶ 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.</li> <li>▶ Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.</li> </ul> <p><b>This must definitely be left to a doctor or person authorised by him/her.</b>                      (ICSC13719)</p>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>▶ For advice, contact a Poisons Information Centre or a doctor at once.</li> <li>▶ Urgent hospital treatment is likely to be needed.</li> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Transport to hospital or doctor without delay.</li> </ul>

**Most important symptoms and effects, both acute and delayed**

See Section 11

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

For acute or short term repeated exposures to strong acids:

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

INGESTION:

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

SKIN:

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

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

**SECTION 5 FIRE-FIGHTING MEASURES****Extinguishing media**

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

**Special hazards arising from the substrate or mixture**

<b>Fire Incompatibility</b>	None known.
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**Special protective equipment and precautions for fire-fighters**

<b>Fire Fighting</b>	
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▶ Non combustible.</li> <li>▶ Not considered to be a significant fire risk.</li> <li>▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ May emit corrosive, poisonous fumes. May emit acrid smoke.</li> </ul> <p>When aluminium oxide dust is dispersed in air, firefighters should wear protection against inhalation of dust particles, which can also contain hazardous substances from the fire absorbed on the alumina particles.</p>

**SECTION 6 ACCIDENTAL RELEASE MEASURES****Personal precautions, protective equipment and emergency procedures**

See section 8

**Environmental precautions**

See section 12

**Methods and material for containment and cleaning up**

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

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

**SECTION 7 HANDLING AND STORAGE****Precautions for safe handling**

<b>Safe handling</b>	<ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ <b>WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.</b></li> <li>▶ Avoid smoking, naked lights or ignition sources.</li> </ul>
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	<ul style="list-style-type: none"> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ When handling, <b>DO NOT eat, drink or smoke.</b></li> <li>▶ Keep containers securely sealed when not in use.</li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> <li>▶ <b>DO NOT allow clothing wet with material to stay in contact with skin</b></li> </ul>
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ Store in a cool, dry, well-ventilated area.</li> <li>▶ Store away from incompatible materials and foodstuff containers.</li> <li>▶ Protect containers against physical damage and check regularly for leaks.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> </ul>

#### Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	<ul style="list-style-type: none"> <li>▶ <b>DO NOT use aluminium or galvanised containers</b></li> <li>▶ Check regularly for spills and leaks</li> <li>▶ Lined metal can, lined metal pail/ can.</li> <li>▶ Plastic pail.</li> <li>▶ Polyliner drum.</li> <li>▶ Packing as recommended by manufacturer.</li> <li>▶ Check all containers are clearly labelled and free from leaks.</li> </ul> <p>For low viscosity materials</p> <ul style="list-style-type: none"> <li>▶ Drums and jericans must be of the non-removable head type.</li> <li>▶ Where a can is to be used as an inner package, the can must have a screwed enclosure.</li> </ul> <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> <li>▶ Removable head packaging;</li> <li>▶ Cans with friction closures and</li> <li>▶ low pressure tubes and cartridges</li> </ul> <p>may be used.</p> <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, porcelain or stoneware, there must be sufficient inert cushioning material in contact with inner and outer packages unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p>
<b>Storage incompatibility</b>	<p>For aluminas (aluminium oxide):</p> <p>Incompatible with hot chlorinated rubber.</p> <p>In the presence of chlorine trifluoride may react violently and ignite.</p> <p>-May initiate explosive polymerisation of olefin oxides including ethylene oxide.</p> <p>-Produces exothermic reaction above 200 C with halocarbons and an exothermic reaction at ambient temperatures with halocarbons in the presence of other metals.</p> <p>-Produces exothermic reaction with oxygen difluoride.</p> <p>-May form explosive mixture with oxygen difluoride.</p> <p>-Forms explosive mixtures with sodium nitrate.</p> <p>-Reacts vigorously with vinyl acetate.</p> <p>Aluminium oxide is an amphoteric substance, meaning it can react with both acids and bases, such as hydrofluoric acid and sodium hydroxide, acting as an acid with a base and a base with an acid, neutralising the other and producing a salt.</p> <ul style="list-style-type: none"> <li>▶ Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.</li> <li>▶ Inorganic acids neutralise chemical bases (for example: amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces.</li> <li>▶ The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat.</li> <li>▶ The addition of water to inorganic acids often generates sufficient heat in the small region of mixing to cause some of the water to boil explosively. The resulting "bumping" can spatter the acid.</li> <li>▶ Inorganic acids react with active metals, including such structural metals as aluminum and iron, to release hydrogen, a flammable gas.</li> <li>▶ Inorganic acids can initiate the polymerisation of certain classes of organic compounds.</li> <li>▶ Inorganic acids react with cyanide compounds to release gaseous hydrogen cyanide.</li> <li>▶ Inorganic acids generate flammable and/or toxic gases in contact with dithiocarbamates, isocyanates, mercaptans, nitrides, nitriles, sulfides, and strong reducing agents. Additional gas-generating reactions occur with sulfites, nitrites, thiosulfates (to give H<sub>2</sub>S and SO<sub>3</sub>), dithionites (SO<sub>2</sub>), and even carbonates.</li> <li>▶ Acids often catalyse (increase the rate of) chemical reactions.</li> </ul> <p>Hydrogen chloride:</p> <ul style="list-style-type: none"> <li>▶ reacts strongly with strong oxidisers (releasing chlorine gas), acetic anhydride, caesium cyanotridecahydrodecaborate(2-), ethylidene difluoride, hexalithium disilicide, metal acetylides, sodium, silicon dioxide, tetraselenium tetranitride, and many organic materials</li> <li>▶ is incompatible with alkaline materials, acetic anhydride, acetylides, aliphatic amines, alkanolamines, alkylene oxides, aluminium, aluminium-titanium alloys, aromatic amines, amines, amides, 2-aminoethanol, ammonia, ammonium hydroxide, borides, calcium phosphide, carbides, carbonates, cyanides, chlorosulfonic acid, ethylenediamine, ethyleneimine, epichlorohydrin, formaldehyde, isocyanates, metals, metal oxides, metal hydroxides, metal acetylides, metal carbides, oleum, organic anhydrides, potassium permanganate, perchloric acid, phosphides, 3-propiolactone, silicides, sulfides, sulfites, sulfuric acid, uranium phosphide, vinyl acetate, vinylidene fluoride</li> <li>▶ attacks most metals forming flammable hydrogen gas, and some plastics, rubbers and coatings</li> <li>▶ reacts with zinc, brass, galvanised iron, aluminium, copper and copper alloys</li> </ul> <ul style="list-style-type: none"> <li>▶ Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.</li> </ul>

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### Control parameters

#### OCCUPATIONAL EXPOSURE LIMITS (OEL)

#### INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
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## ICP Analytical Mixture 5

US OSHA Permissible Exposure Levels (PELs) - Table Z1	aluminium	Aluminum, metal	15 mg/m3	Not Available	Not Available	Total dust; (as Al)
US OSHA Permissible Exposure Levels (PELs) - Table Z1	aluminium	Aluminum, metal- Respirable fraction	5 mg/m3	Not Available	Not Available	(as Al)
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 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	cadmium	Cadmium	0.005 mg/m3	Not Available	Not Available	see 1910.1027;(as Cd)
US NIOSH Recommended Exposure Limits (RELs)	cadmium	Cadmium metal: Cadmium	0.01 mg/m3	Not Available	Not Available	Ca See Appendix A [*Note: The REL applies to all Cadmium compounds (as Cd).]
US ACGIH Threshold Limit Values (TLV)	cadmium	Cadmium	Not Available	Not Available	Not Available	TLV® Basis: Kidney dam; BEI
US NIOSH Recommended Exposure Limits (RELs)	chromium	Chrome, Chromium	0.5 mg/m3	Not Available	Not Available	Not Available
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 NIOSH Recommended Exposure Limits (RELs)	cobalt	Cobalt metal dust, Cobalt metal fume	0.05 mg/m3	Not Available	Not Available	TLV® Basis: Pneumonitis
US ACGIH Threshold Limit Values (TLV)	cobalt	Hard metals containing Cobalt and Tungsten carbide, as Co	0.005 mg/m3	Not Available	Not Available	Not Available
US NIOSH Recommended Exposure Limits (RELs)	copper	Copper metal dusts, Copper metal fumes	1 mg/m3	Not Available	Not Available	[*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]
US ACGIH Threshold Limit Values (TLV)	copper	Copper - Fume, as Cu	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Irr; GI; metal fume fever; BEI
US ACGIH Threshold Limit Values (TLV)	copper	Copper - Dusts and mists, as Cu	1 mg/m3	Not Available	Not Available	TLV® Basis: Irr; GI; metal fume fever; BEI
US NIOSH Recommended Exposure Limits (RELs)	lead	Lead metal, Plumbum	0.050 mg/m3	Not Available	Not Available	See Appendix C [*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.]
US 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 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 OSHA Permissible Exposure Levels (PELs) - Table Z1	hydrochloric acid	Hydrogen chloride	Not Available	Not Available	7 mg/m3 / 5 ppm	TLV® Basis: URT irr
US NIOSH Recommended Exposure Limits (RELs)	hydrochloric acid	Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) [Note: Often used in an aqueous solution.]	Not Available	Not Available	7 mg/m3 / 5 ppm	Not Available
US ACGIH Threshold Limit Values (TLV)	hydrochloric acid	Hydrogen chloride	Not Available	Not Available	2 ppm	Not Available

## EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
barium	Barium	1.5 mg/m3	180 mg/m3	1,100 mg/m3
cadmium	Cadmium	Not Available	Not Available	Not Available
chromium	Chromium	1.5 mg/m3	17 mg/m3	99 mg/m3
cobalt	Cobalt	0.18 mg/m3	2 mg/m3	20 mg/m3
copper	Copper	3 mg/m3	33 mg/m3	200 mg/m3
iron	Iron	3.2 mg/m3	35 mg/m3	150 mg/m3
lead	Lead	0.15 mg/m3	120 mg/m3	700 mg/m3
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
nickel	Nickel	4.5 mg/m3	50 mg/m3	99 mg/m3
zinc	Zinc	6 mg/m3	21 mg/m3	120 mg/m3
hydrochloric acid	Hydrogen chloride; (Hydrochloric acid)	Not Available	Not Available	Not Available
hydrochloric acid	Deuteriochloric acid; (Deuterium chloride)	1.8 ppm	22 ppm	100 ppm


Ingredient	Original IDLH	Revised IDLH
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Continued...

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aluminium	Not Available	Not Available
arsenic	100 mg/m3	5 mg/m3
barium	1,100 mg/m3	50 mg/m3
beryllium acetate	10 mg/m3	4 mg/m3
cadmium	50 mg/m3 / 9 mg/m3	9 mg/m3 / 9 [Unch] mg/m3
chromium	N.E. / N.E.	250 mg/m3
cobalt	20 mg/m3	20 [Unch] mg/m3
copper	N.E. / N.E.	100 mg/m3
iron	Not Available	Not Available
lead	700 mg/m3	100 mg/m3
manganese(II) acetate tetrahydrate	N.E. / N.E.	500 mg/m3
nickel	N.E. / N.E.	10 mg/m3
zinc	Not Available	Not Available
hydrochloric acid	100 ppm	50 ppm
water	Not Available	Not Available

## Exposure controls

<p><b>Appropriate engineering controls</b></p>	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection.</p> <p>An approved self contained breathing apparatus (SCBA) may be required in some situations.</p> <p>Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p> <table border="1" data-bbox="363 1108 1495 1361"> <thead> <tr> <th>Type of Contaminant:</th> <th>Air Speed:</th> </tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td> <td>0.25-0.5 m/s (50-100 f/min.)</td> </tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td> <td>0.5-1 m/s (100-200 f/min.)</td> </tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td> <td>1-2.5 m/s (200-500 f/min.)</td> </tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td> <td>2.5-10 m/s (500-2000 f/min.)</td> </tr> </tbody> </table> <p>Within each range the appropriate value depends on:</p> <table border="1" data-bbox="363 1422 1495 1585"> <thead> <tr> <th>Lower end of the range</th> <th>Upper end of the range</th> </tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td> <td>1: Disturbing room air currents</td> </tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only.</td> <td>2: Contaminants of high toxicity</td> </tr> <tr> <td>3: Intermittent, low production.</td> <td>3: High production, heavy use</td> </tr> <tr> <td>4: Large hood or large air mass in motion</td> <td>4: Small hood-local control only</td> </tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	Lower end of the range	Upper end of the range	1: Room air currents minimal or favourable to capture	1: Disturbing room air currents	2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity	3: Intermittent, low production.	3: High production, heavy use	4: Large hood or large air mass in motion	4: Small hood-local control only
Type of Contaminant:	Air Speed:																				
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)																				
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)																				
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)																				
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)																				
Lower end of the range	Upper end of the range																				
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents																				
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity																				
3: Intermittent, low production.	3: High production, heavy use																				
4: Large hood or large air mass in motion	4: Small hood-local control only																				
<p><b>Personal protection</b></p>																					
<p><b>Eye and face protection</b></p>	<ul style="list-style-type: none"> <li>▶ 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.</li> <li>▶ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted.</li> <li>▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.</li> <li>▶ Alternatively a gas mask may replace splash goggles and face shields.</li> <li>▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]</li> </ul>																				

## ICP Analytical Mixture 5

<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Elbow length PVC gloves</li> <li>▶ When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.</li> </ul> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> <li>· frequency and duration of contact,</li> <li>· chemical resistance of glove material,</li> <li>· glove thickness and</li> <li>· dexterity</li> </ul> <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> <li>· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.</li> <li>· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.</li> <li>· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.</li> <li>· Contaminated gloves should be replaced.</li> </ul> <p>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.</p> <p>It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.</p> <p>Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.</p> <p>Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:</p> <ul style="list-style-type: none"> <li>· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.</li> <li>· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential</li> </ul> <p>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p>
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	<ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ PVC Apron.</li> <li>▶ PVC protective suit may be required if exposure severe.</li> <li>▶ Eyewash unit.</li> <li>▶ Ensure there is ready access to a safety shower.</li> </ul>
<b>Thermal hazards</b>	Not Available

**Respiratory protection**

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

76b-p()

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

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

**SECTION 10 STABILITY AND REACTIVITY**

ICP Analytical Mixture 5

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	▶ Contact with alkaline material liberates heat
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

**SECTION 11 TOXICOLOGICAL INFORMATION**

**Information on toxicological effects**

<b>Inhaled</b>	<p>The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.</p> <p>The material has <b>NOT</b> been classified by EC Directives or other classification systems as "harmful by inhalation". This is because of the lack of corroborating animal or human evidence.</p> <p>Hydrogen chloride (HCl) vapour or fumes present a hazard from a single acute exposure. Exposures of 1300 to 2000 ppm have been lethal to humans in a few minutes.</p> <p>Inhalation of HCl may cause choking, coughing, burning sensation and may cause ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalised lung damage may follow.</p> <p>Breathing of HCl vapour may aggravate asthma and inflammatory or fibrotic pulmonary disease.</p> <p>High concentrations cause necrosis of the tracheal and bronchial epithelium, pulmonary oedema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver.</p>
<b>Ingestion</b>	<p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.</p> <p>The material has <b>NOT</b> been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.</p>
<b>Skin Contact</b>	<p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue. Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.</p> <p>Though considered non-harmful, slight irritation may result from contact because of the abrasive nature of the aluminium oxide particles. Thus it may cause itching and skin reaction and inflammation.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p>
<b>Eye</b>	<p>If applied to the eyes, this material causes severe eye damage.</p> <p>Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.</p>
<b>Chronic</b>	<p>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p> <p>Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems.</p> <p>Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.</p> <p>Animal testing shows long term exposure to aluminium oxides may cause lung disease and cancer, depending on the size of the particle. The smaller the size, the greater the tendencies of causing harm.</p> <p>There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.</p> <p>Chronic minor exposure to hydrogen chloride (HCl) vapour or fume may cause discolouration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the mucous membranes of the nose. Workers exposed to hydrochloric acid suffered from stomach inflammation and a number of cases of chronic bronchitis (airway inflammation) have also been reported. Repeated or prolonged exposure to dilute solutions of hydrogen chloride may cause skin inflammation.</p>

<b>ICP Analytical Mixture 5</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>aluminium</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
<b>arsenic</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: 763 mg/kg <sup>[2]</sup>	Not Available
<b>barium</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>beryllium acetate</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>cadmium</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: >63<259 mg/kg <sup>[1]</sup>	Not Available



chromium	TOXICITY	IRRITATION
	Not Available	Not Available
cobalt	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Oral (rat) LD50: 6170 mg/kg <sup>[2]</sup>	
copper	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation (rat) LC50: 0.733 mg/l/4hr <sup>[1]</sup>	
	Inhalation (rat) LC50: 1.03 mg/l/4hr <sup>[1]</sup>	
	Oral (rat) LD50: 300-500 mg/kg <sup>[1]</sup>	
iron	TOXICITY	IRRITATION
	Oral (rat) LD50: 98600 mg/kg <sup>[2]</sup>	Not Available
lead	TOXICITY	IRRITATION
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation (rat) LC50: >5.05 mg/l/4hr <sup>[1]</sup>	
manganese(II) acetate tetrahydrate	TOXICITY	IRRITATION
	Oral (rat) LD50: 3730 mg/kg <sup>[2]</sup>	Not Available
nickel	TOXICITY	IRRITATION
	Oral (rat) LD50: 5000 mg/kg <sup>[2]</sup>	Not Available
zinc	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 1130 mg/kg <sup>[2]</sup>	Not Available
hydrochloric acid	TOXICITY	IRRITATION
	Inhalation (rat) LC50: 781 ppm/1hr <sup>[2]</sup>	Eye (rabbit): 5mg/30s - mild
water	TOXICITY	IRRITATION
	Not Available	Not Available

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

ARSENIC	Arsenic compounds are classified by the European Union as toxic by inhalation and ingestion and toxic to aquatic life and long lasting in the environment. Tumorigenic - Carcinogenic by RTECS criteria.
CHROMIUM	On skin and inhalation exposure, chromium and its compounds (except hexavalent) can be a potent sensitiser, as particulates. Tenth Annual Report on Carcinogens: Substance known to be Carcinogenic [National Toxicology Program: U.S. Dep. Gastrointestinal tumours, lymphoma, musculoskeletal tumours and tumours at site of application recorded.
COBALT	Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Attention should be paid to atopic diathesis, characterised by increased susceptibility to nasal inflammation, asthma and eczema. Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved.
COPPER	for copper and its compounds (typically copper chloride): <b>Acute toxicity:</b> There are no reliable acute oral toxicity results available. <b>WARNING:</b> Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. tiredness, influenza like respiratory tract irritation with fever.

<b>LEAD</b>	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.
<b>NICKEL</b>	Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen [National Toxicology Program: U.S. Dep. Oral (rat) TDL <sub>0</sub> : 500 mg/kg/5D-I Inhalation (rat) TCL <sub>0</sub> : 0.1 mg/m <sup>3</sup> /24H/17W-C
<b>ZINC</b>	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.
<b>HYDROCHLORIC ACID</b>	For acid mists, aerosols, vapours Test results suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. The material may be irritating to the eye, with prolonged contact causing inflammation.
<b>ALUMINIUM &amp; BARIUM &amp; CHROMIUM &amp; HYDROCHLORIC ACID &amp; WATER</b>	No significant acute toxicological data identified in literature search.
<b>ARSENIC &amp; BERYLLIUM ACETATE</b>	<b>WARNING:</b> This substance has been classified by the IARC as Group 1: <b>CARCINOGENIC TO HUMANS.</b>
<b>BARIUM &amp; BERYLLIUM ACETATE &amp; MANGANESE(II) ACETATE TETRAHYDRATE &amp; HYDROCHLORIC ACID</b>	Asthma-like symptoms may continue for months or even years after exposure to the material ends.
<b>BERYLLIUM ACETATE &amp; COBALT &amp; NICKEL</b>	The following information refers to contact allergens as a group and may not be specific to this product.
<b>CHROMIUM &amp; HYDROCHLORIC ACID</b>	The substance is classified by IARC as Group 3: <b>NOT</b> classifiable as to its carcinogenicity to humans.
<b>COBALT &amp; NICKEL</b>	<b>WARNING:</b> This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

Acute Toxicity	☒	Carcinogenicity	☒
Skin Irritation/Corrosion	✓	Reproductivity	☒
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	☒
Respiratory or Skin sensitisation	☒	STOT - Repeated Exposure	☒
Mutagenicity	☒	Aspiration Hazard	☒

Legend: ✗ – Data 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

ICP Analytical Mixture 5	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

aluminium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.078-0.108mg/L	2
	EC50	48	Crustacea	0.7364mg/L	2
	EC50	96	Algae or other aquatic plants	0.0054mg/L	2
	BCF	360	Algae or other aquatic plants	9mg/L	4
	EC50	120	Fish	0.000051mg/L	5
	NOEC	72	Algae or other aquatic plants	>=0.004mg/L	2

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

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

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

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

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

cobalt	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	1.406mg/L	2
	EC50	48	Crustacea	>0.89mg/L	2
	EC50	72	Algae or other aquatic plants	0.144mg/L	2
	BCF	1344	Fish	0.99mg/L	4
	NOEC	168	Algae or other aquatic plants	0.0018mg/L	2

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

iron	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.05mg/L	2
	EC50	96	Algae or other aquatic plants	3.7mg/L	4
	BCF	24	Crustacea	0.000002mg/L	4
	NOEC	504	Fish	0.52mg/L	2

lead	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.0079mg/L	2
	EC50	48	Crustacea	0.029mg/L	2
	EC50	72	Algae or other aquatic plants	0.0205mg/L	2
	BCFD	8	Fish	4.324mg/L	4
	NOEC	672	Fish	0.00003mg/L	4

manganese(II) acetate tetrahydrate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

nickel	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.0000475mg/L	4

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	EC50	48	Crustacea	0.013mg/L	5
	EC50	72	Algae or other aquatic plants	0.0407mg/L	2
	BCF	1440	Algae or other aquatic plants	0.47mg/L	4
	EC50	720	Crustacea	0.0062mg/L	2
	NOEC	72	Algae or other aquatic plants	0.0035mg/L	2

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
<b>zinc</b>	LC50	96	Fish	0.00272mg/L	4
	EC50	48	Crustacea	0.04mg/L	5
	EC50	72	Algae or other aquatic plants	0.106mg/L	4
	BCF	360	Algae or other aquatic plants	9mg/L	4
	EC50	120	Fish	0.00033mg/L	5
	NOEC	336	Algae or other aquatic plants	0.00075mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
<b>hydrochloric acid</b>	LC50	96	Fish	70.057mg/L	3
	EC50	96	Algae or other aquatic plants	344.947mg/L	3
	EC50	9.33	Fish	0.014000mg/L	4
	NOEC	0.08	Fish	10mg/L	4

	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
<b>water</b>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

**Legend:** *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

**Ecotoxicity:**

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

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
hydrochloric acid	LOW	LOW
water	LOW	LOW

**Bioaccumulative potential**

Ingredient	Bioaccumulation
hydrochloric acid	LOW (LogKOW = 0.5392)
water	LOW (LogKOW = -1.38)

**Mobility in soil**

Ingredient	Mobility
hydrochloric acid	LOW (KOC = 14.3)
water	LOW (KOC = 14.3)

**SECTION 13 DISPOSAL CONSIDERATIONS**

**Waste treatment methods**


<b>Product / Packaging disposal</b>	<p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> <li>▶ Reduction</li> <li>▶ Reuse</li> <li>▶ Recycling</li> <li>▶ Disposal (if all else fails)</li> </ul> <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.</p>

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- ▶ **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- ▶ It may be necessary to collect all wash water for treatment before disposal.
- ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- ▶ Where in doubt contact the responsible authority.
- ▶ Recycle wherever possible.
- ▶ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- ▶ Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material).
- ▶ Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

**SECTION 14 TRANSPORT INFORMATION**

**Labels Required**

	
<b>Marine Pollutant</b>	NO

**Land transport (DOT)**

<b>UN number</b>	1789				
<b>UN proper shipping name</b>	Hydrochloric acid				
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>Class</td> <td>8</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	8	Subrisk	Not Applicable
Class	8				
Subrisk	Not Applicable				
<b>Packing group</b>	II				
<b>Environmental hazard</b>	Not Applicable				
<b>Special precautions for user</b>	<table border="1"> <tr> <td>Hazard Label</td> <td>8</td> </tr> <tr> <td>Special provisions</td> <td>386, A3, A6, B3, B15, B133, IB2, N41, T8, TP2</td> </tr> </table>	Hazard Label	8	Special provisions	386, A3, A6, B3, B15, B133, IB2, N41, T8, TP2
Hazard Label	8				
Special provisions	386, A3, A6, B3, B15, B133, IB2, N41, T8, TP2				

**Air transport (ICAO-IATA / DGR)**

<b>UN number</b>	1789														
<b>UN proper shipping name</b>	HYDROCHLORIC ACID														
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>ICAO/IATA Class</td> <td>8</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>8L</td> </tr> </table>	ICAO/IATA Class	8	ICAO / IATA Subrisk	Not Applicable	ERG Code	8L								
ICAO/IATA Class	8														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	8L														
<b>Packing group</b>	II														
<b>Environmental hazard</b>	Not Applicable														
<b>Special precautions for user</b>	<table border="1"> <tr> <td>Special provisions</td> <td>A3A803</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>855</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>30 L</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>851</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>1 L</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Y840</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>0.5 L</td> </tr> </table>	Special provisions	A3A803	Cargo Only Packing Instructions	855	Cargo Only Maximum Qty / Pack	30 L	Passenger and Cargo Packing Instructions	851	Passenger and Cargo Maximum Qty / Pack	1 L	Passenger and Cargo Limited Quantity Packing Instructions	Y840	Passenger and Cargo Limited Maximum Qty / Pack	0.5 L
Special provisions	A3A803														
Cargo Only Packing Instructions	855														
Cargo Only Maximum Qty / Pack	30 L														
Passenger and Cargo Packing Instructions	851														
Passenger and Cargo Maximum Qty / Pack	1 L														
Passenger and Cargo Limited Quantity Packing Instructions	Y840														
Passenger and Cargo Limited Maximum Qty / Pack	0.5 L														

**Sea transport (IMDG-Code / GGVSee)**

<b>UN number</b>	1789				
<b>UN proper shipping name</b>	Hydrochloric acid				
<b>Transport hazard class(es)</b>	<table border="1"> <tr> <td>IMDG Class</td> <td>8</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>	IMDG Class	8	IMDG Subrisk	Not Applicable
IMDG Class	8				
IMDG Subrisk	Not Applicable				
<b>Packing group</b>	II				
<b>Environmental hazard</b>	Not Applicable				

<b>Special precautions for user</b>	EMS Number	F-A, S-B
	Special provisions	Not Applicable
	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	Hydrochloric acid	Z	3

**SECTION 15 REGULATORY INFORMATION****Safety, health and environmental regulations / legislation specific for the substance or mixture****ALUMINIUM(7429-90-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

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

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

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

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

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

**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

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
 US - Alaska Limits for Air Contaminants  
 US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity  
 US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)  
 US - California Permissible Exposure Limits for Chemical Contaminants  
 US - California Proposition 65 - Carcinogens  
 US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity  
 US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens  
 US - California Proposition 65 - Reproductive Toxicity  
 US - Hawaii Air Contaminant Limits  
 US - Idaho - Acceptable Maximum Peak Concentrations  
 US - Idaho - Limits for Air Contaminants  
 US - Massachusetts - Right To Know Listed Chemicals  
 US - Michigan Exposure Limits for Air Contaminants  
 US - Minnesota Permissible Exposure Limits (PELs)  
 US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens  
 US - Oregon Permissible Exposure Limits (Z-1)  
 US - Oregon Permissible Exposure Limits (Z-2)  
 US - Pennsylvania - Hazardous Substance List  
 US - Rhode Island Hazardous Substance List  
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
 US - Alaska Limits for Air Contaminants  
 US - California Permissible Exposure Limits for Chemical Contaminants  
 US - Hawaii Air Contaminant Limits  
 US - Idaho - Limits for Air Contaminants  
 US - Massachusetts - Right To Know Listed Chemicals  
 US - Michigan Exposure Limits for Air Contaminants  
 US - Oregon Permissible Exposure Limits (Z-1)  
 US - Pennsylvania - Hazardous Substance List  
 US - Rhode Island Hazardous Substance List  
 US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants  
 US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants

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

US - Washington Permissible exposure limits of air contaminants  
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values  
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants  
 US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift  
 US ACGIH Threshold Limit Values (TLV)  
 US ACGIH Threshold Limit Values (TLV) - Carcinogens  
 US Clean Air Act - Hazardous Air Pollutants  
 US CWA (Clean Water Act) - Priority Pollutants  
 US CWA (Clean Water Act) - Toxic Pollutants  
 US EPA Carcinogens Listing  
 US EPCRA Section 313 Chemical List  
 US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens  
 US OSHA Permissible Exposure Levels (PELs) - Table Z1  
 US OSHA Permissible Exposure Levels (PELs) - Table Z2

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants  
 US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants  
 US - Washington Permissible exposure limits of air contaminants  
 US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values  
 US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants  
 US - Wyoming Toxic and Hazardous Substances Table Z-2 Acceptable ceiling concentration, Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift  
 US ACGIH Threshold Limit Values (TLV)  
 US ACGIH Threshold Limit Values (TLV) - Carcinogens  
 US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)  
 US Clean Air Act - Hazardous Air Pollutants  
 US CWA (Clean Water Act) - Priority Pollutants  
 US CWA (Clean Water Act) - Toxic Pollutants  
 US EPA Carcinogens Listing  
 US EPCRA Section 313 Chemical List  
 US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens  
 US NIOSH Recommended Exposure Limits (RELs)  
 US OSHA Carcinogens Listing  
 US OSHA Permissible Exposure Levels (PELs) - Table Z1  
 US OSHA Permissible Exposure Levels (PELs) - Table Z2  
 US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	US - Washington Permissible exposure limits of air contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California Proposition 65 - Carcinogens	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Hawaii Air Contaminant Limits	US ACGIH Threshold Limit Values (TLV)
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Massachusetts - Right To Know Listed Chemicals	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Michigan Exposure Limits for Air Contaminants	US Clean Air Act - Hazardous Air Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens	US National Toxicology Program (NTP) 14th Report Part B.
US - Oregon Permissible Exposure Limits (Z-1)	US NIOSH Recommended Exposure Limits (RELs)
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Rhode Island Hazardous Substance List	US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	
<b>COPPER(7440-50-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS</b>	
US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)	US - Washington Permissible exposure limits of air contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Hawaii Air Contaminant Limits	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Massachusetts - Right To Know Listed Chemicals	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - Priority Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US CWA (Clean Water Act) - Toxic Pollutants
US - Oregon Permissible Exposure Limits (Z-1)	US EPA Carcinogens Listing
US - Pennsylvania - Hazardous Substance List	US EPCRA Section 313 Chemical List
US - Rhode Island Hazardous Substance List	US NIOSH Recommended Exposure Limits (RELs)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
<b>IRON(7439-89-6) IS FOUND ON THE FOLLOWING REGULATORY LISTS</b>	
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Oregon Permissible Exposure Limits (Z-1)
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Permissible exposure limits of air contaminants
US - Hawaii Air Contaminant Limits	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
<b>LEAD(7439-92-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS</b>	
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Permissible exposure limits of air contaminants
US - California Proposition 65 - Carcinogens	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity	US ACGIH Threshold Limit Values (TLV)
US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - California Proposition 65 - Reproductive Toxicity	US Clean Air Act - Hazardous Air Pollutants
US - Hawaii Air Contaminant Limits	US CWA (Clean Water Act) - Priority Pollutants
US - Idaho - Acceptable Maximum Peak Concentrations	US CWA (Clean Water Act) - Toxic Pollutants
US - Idaho - Limits for Air Contaminants	US EPA Carcinogens Listing
US - Massachusetts - Right To Know Listed Chemicals	US EPCRA Section 313 Chemical List
US - Minnesota Permissible Exposure Limits (PELs)	US National Toxicology Program (NTP) 14th Report Part B.
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens	US NIOSH Recommended Exposure Limits (RELs)
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Rhode Island Hazardous Substance List	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
<b>MANGANESE(II) ACETATE TETRAHYDRATE(6156-78-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS</b>	
US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Permissible exposure limits of air contaminants
US - Hawaii Air Contaminant Limits	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - Idaho - Limits for Air Contaminants	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Michigan Exposure Limits for Air Contaminants	US Clean Air Act - Hazardous Air Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - Oregon Permissible Exposure Limits (Z-1)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
<b>NICKEL(7440-02-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS</b>	



US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELS)	US - Washington Permissible exposure limits of air contaminants
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US ACGIH Threshold Limit Values (TLV)
US - California Proposition 65 - Carcinogens	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Hawaii Air Contaminant Limits	US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)
US - Idaho - Limits for Air Contaminants	US Clean Air Act - Hazardous Air Pollutants
US - Massachusetts - Right To Know Listed Chemicals	US CWA (Clean Water Act) - Priority Pollutants
US - Michigan Exposure Limits for Air Contaminants	US CWA (Clean Water Act) - Toxic Pollutants
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens	US National Toxicology Program (NTP) 14th Report Part B.
US - Oregon Permissible Exposure Limits (Z-1)	US NIOSH Recommended Exposure Limits (RELs)
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Rhode Island Hazardous Substance List	US Priority List for the Development of Proposition 65 Safe Harbor Levels - No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	

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

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

**HYDROCHLORIC ACID(7647-01-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	US - Washington Permissible exposure limits of air contaminants
US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELS)	US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values
US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Hawaii Air Contaminant Limits	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Idaho - Limits for Air Contaminants	US Clean Air Act - Hazardous Air Pollutants
US - Massachusetts - Right To Know Listed Chemicals	US CWA (Clean Water Act) - List of Hazardous Substances
US - Michigan Exposure Limits for Air Contaminants	US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals
US - Minnesota Permissible Exposure Limits (PELs)	US EPCRA Section 313 Chemical List
US - Oregon Permissible Exposure Limits (Z-1)	US NIOSH Recommended Exposure Limits (RELs)
US - Pennsylvania - Hazardous Substance List	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - Rhode Island Hazardous Substance List	US SARA Section 302 Extremely Hazardous Substances
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

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

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

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**SECTION 311/312 HAZARD CATEGORIES**

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

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

Name	Reportable Quantity in Pounds (lb)	Reportable Quantity in kg
Arsenic	1	0.454
Cadmium	10	4.54
Chromium	5000	2270
Copper	5000	2270
Lead	10	4.54
Nickel	100	45.4
Zinc	1000	454

Hydrochloric acid	5000	2270
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## State Regulations

### US. CALIFORNIA PROPOSITION 65

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

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

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

National Inventory	Status
Australia - AICS	N (beryllium acetate)
Canada - DSL	N (beryllium acetate)
Canada - NDSL	N (lead; zinc; copper; hydrochloric acid; water; barium; aluminium; arsenic; cobalt; nickel; manganese(II) acetate tetrahydrate; iron; chromium; beryllium acetate; cadmium)
China - IECSC	N (beryllium acetate)
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	N (zinc; copper; water; barium; aluminium; arsenic; cobalt; nickel; manganese(II) acetate tetrahydrate; iron; chromium; beryllium acetate; cadmium)
Korea - KECI	N (beryllium acetate)
New Zealand - NZIoC	N (beryllium acetate)
Philippines - PICCS	N (beryllium acetate)
USA - TSCA	N (beryllium acetate)
<b>Legend:</b>	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

## SECTION 16 OTHER INFORMATION

### Other information

#### Ingredients with multiple cas numbers

Name	CAS No
aluminium	7429-90-5, 91728-14-2
copper	7440-50-8, 133353-46-5, 133353-47-6, 195161-80-9, 65555-90-0, 72514-83-1

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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