

S-WELD CLEAN

Chemwatch Independent Material Safety Data Sheet

Issue Date: 14-Oct-2010

NC317TCP

CHEMWATCH 62117

Version No:4

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

S-WELD CLEAN

PROPER SHIPPING NAME

CORROSIVE LIQUID, TOXIC, N.O.S.(contains nitric acid hydrofluoric acid)

PRODUCT USE

Stainless steel weld scale remover.

SUPPLIER

Company: Callington Haven Pty Ltd

Address:

30 South Street

Rydalmere

NSW, 2116

Australia

Telephone: +61 2 9898 2788

Emergency Tel: 1800 039 008 (24 hours)

Emergency Tel: +61 3 9573 3112

Fax: +61 2 9684 4215

Email: sales@calhaven.com.au

Website: www.callingtonhaven.com

Company: Callington Haven Pty Ltd

Address:

PO Box 144

Rydalmere

NSW, 2116

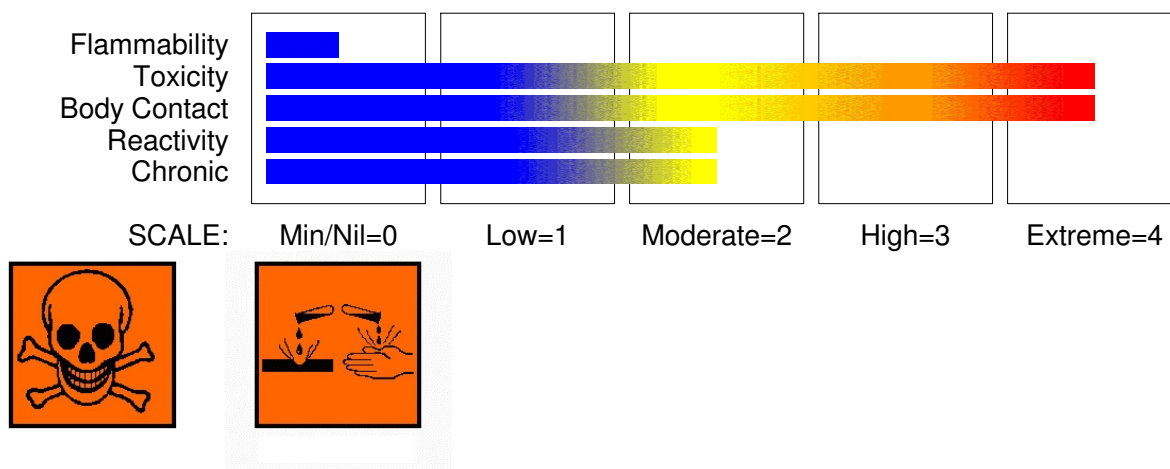
Australia

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. DANGEROUS GOODS. According to NOHSC Criteria, and ADG Code.

CHEMWATCH HAZARD RATINGS



RISK

- Very toxic by inhalation, in contact with skin and if swallowed.
- Causes severe burns.
- Risk of serious damage to eyes.

SAFETY

- Keep locked up.
- Avoid contact with eyes.
- Wear suitable protective clothing.

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Section 2 - HAZARDS IDENTIFICATION

- In case of insufficient ventilation, wear suitable respiratory equipment.
- To clean the floor and all objects contaminated by this material, use water.
- This material and its container must be disposed of in a safe way.
- Keep away from food, drink and animal feeding stuffs.
- Take off immediately all contaminated clothing.
- In case of accident or if you feel unwell, IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).
- This material and its container must be disposed of as hazardous waste.
- In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
nitric acid	7697-37-2	10-30
hydrofluoric acid	7664-39-3	<10
performance additives		10-30
water	7732-18-5	30-60

NOTE: Manufacturer has supplied full ingredient information to allow CHEMWATCH assessment.

Section 4 - FIRST AID MEASURES

SWALLOWED

- DO NOT delay. Rinse mouth out with plenty of water.

Transport to hospital or doctor and seek immediate medical attention.

DO NOT INDUCE vomiting.

If patient is conscious, give six calcium gluconate or calcium carbonate tablets dissolved in water, by mouth.

EYE

- DO NOT delay.

If this product or its vapours come in contact with the eyes,

- DO NOT DELAY: Immediately irrigate continuously by holding the eyelids apart and washing with fresh 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, eye clinic or eye specialist, ophthalmologist without delay.

SKIN

- DO NOT delay.

If there is evidence of severe skin irritation or skin burns:

- Avoid further contact. Immediately remove contaminated clothing, including footwear.
- Flush skin under running water for 15 minutes.
- Avoiding contamination of the hands, massage calcium gluconate gel into affected areas, pay particular attention to creases in skin.
- Contact the Poisons Information Centre.
- Continue gel application for at least 15 minutes after burning sensation ceases.

continued...

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Section 4 - FIRST AID MEASURES

- If pain recurs, repeat application of calcium gluconate gel or apply every 20 minutes.
- If no gel is available, continue washing for at least 15 minutes, using soap if available. If patient is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth.
- Transport to hospital, or doctor, urgently.

INHALED

- For massive exposures:
 - If dusts, vapours, aerosols, fumes or combustion products are inhaled, remove from contaminated area.
 - Lay patient down.
 - Keep warm and rested.
 - Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
 - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
 - If victim is conscious, give six calcium gluconate or calcium carbonate tablets in water by mouth.
 - Transport to hospital, or doctor, urgently.

NOTES TO PHYSICIAN

- 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.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

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

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Consider evacuation (or protect in place).
- Use water delivered as a fine spray to control fire and cool adjacent area.

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Section 5 - FIRE FIGHTING MEASURES

- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered to be a significant fire risk.
 - Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
 - Decomposes on heating and may produce toxic fumes of carbon monoxide (CO).
 - May emit acrid smoke. May emit corrosive fumes.
- Other decomposition products include: carbon dioxide (CO₂), hydrogen fluoride and nitrogen oxides (NO_x).

FIRE INCOMPATIBILITY

- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
- Avoid storage with glass, cement, concrete and other silicon materials; reaction produces toxic silicon tetrafluoride gas; which may pressurise and/or rupture containers.
- Avoid reaction with organic materials / compounds, powdered metals, reducing agents and hydrogen sulfide (H₂S) as ignition may result.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.

HAZCHEM

2X

Personal Protective Equipment

Breathing apparatus.

Gas tight chemical resistant suit.

Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- DO NOT touch the spill material.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Wear impervious gloves and safety glasses.
- Use soda ash or slaked lime to neutralise.
- Trowel up/scrape up.
- Place spilled material in clean, dry, sealable, labelled container.
- Flush spill area with water.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing

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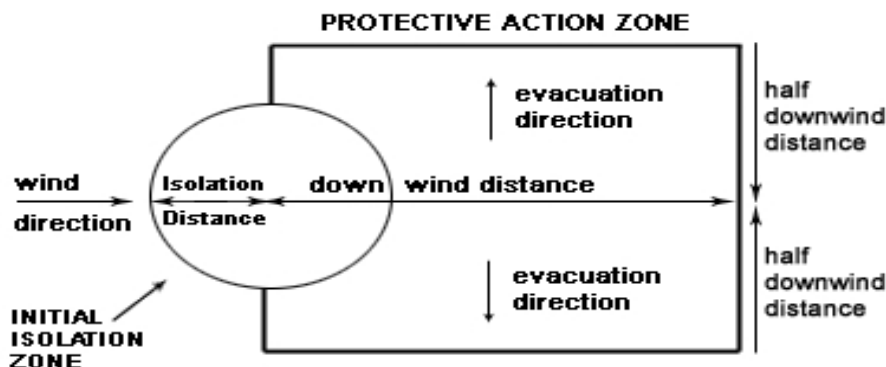
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Section 6 - ACCIDENTAL RELEASE MEASURES

and re-using.

- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)

Isolation Distance	25 metres
Downwind Protection Distance	250 metres
IERG Number	37

FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".

LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 154 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

nitric acid 78ppm

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

nitric acid 6ppm

other than mild, transient adverse effects without perceiving a clearly defined odour is:

nitric acid 1ppm

American Industrial Hygiene Association (AIHA)

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Section 6 - ACCIDENTAL RELEASE MEASURES

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
R51	$\geq 2.5\%$		
else	$\geq 10\%$		

where percentage is percentage of ingredient found in the mixture

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin.
- Use good occupational work practice. Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Avoid contact with incompatible materials.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Handle and open container with care.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Wash hands with soap and water after handling.
- Work clothes should be laundered separately: NOT at home.

SUITABLE CONTAINER

- Polyethylene or polypropylene container.
- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

- Avoid storage with glass, cement, concrete and other silicon materials; reaction produces toxic silicon tetrafluoride gas; which may pressurise and/or rupture containers.
- DO NOT use unlined steel containers.
- DO NOT use aluminium, galvanised or tin-plated containers.
- Segregate from alkalis, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates, combustible materials and metal oxides.

STORAGE REQUIREMENTS

- Store in original containers.
 - Keep containers securely sealed.
 - Store in a cool, dry area protected from environmental extremes.
 - Store away from incompatible materials and foodstuff containers.
 - Protect containers against physical damage and check regularly for leaks.
 - Observe manufacturer's storing and handling recommendations
- For major quantities:
- Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams).
 - Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.
 - Keep containers securely sealed.
- Store in a cool, dry and well-ventilated area.
- Store away from incompatible materials.

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Section 7 - HANDLING AND STORAGE

Floors should be covered or coated with acid resistant material.

DO NOT stack on wooden pallets.

• DO NOT store in pits, depressions, basements or areas where vapours may be trapped.

Protect containers against physical damage.

• Check regularly for spills and leaks.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X X + X X +

+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³
Australia Exposure Standards	nitric acid (Nitric acid)	2	5.2	4	10		
Australia Exposure Standards	hydrofluoric acid (Hydrogen fluoride (as F))					3	2.6

The following materials had no OELs on our records

• water:

CAS:7732- 18- 5

EMERGENCY EXPOSURE LIMITS

Material	Revised	IDLH
nitric acid	3	25
hydrofluoric acid	1	30 [Unch]
hydrofluoric acid 1790- 1	250	

ODOUR SAFETY FACTOR (OSF)

OSF=71 (hydrofluoric acid)

MATERIAL DATA

HYDROFLUORIC ACID:

S-WELD CLEAN:

■ Exposed individuals are reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class A or B.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted
C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

S-WELD CLEAN:

- None assigned. Refer to individual constituents.

NITRIC ACID:

- For nitric acid:

Odour Threshold Value: 0.27 ppm (detection)

NOTE: Detector tubes for nitric acid, measuring in excess of 5 ppm, are commercially available.

The TLV-TWA is protective against corrosion of the skin, tissue and other membranes, against irritation to the eyes and mucous membranes, and against acute pulmonary oedema or chronic obstructive lung disease. It is not clear whether the TLV-TWA and STEL values will prevent potentiation of the toxicity of inhaled nitrogen dioxide.

HYDROFLUORIC ACID:

- Odour Threshold for hydrogen fluoride: 0.042 ppm

NOTE: Detector tubes for hydrogen fluoride, measuring in excess of 1.5 ppm, are available commercially.

Long-term measurements (8 hrs) may be conducted to detect concentrations exceeding 0.25 ppm.

Hydrogen fluoride is a primary irritant which as a gas causes severe respiratory irritation and as a liquid which causes severe and painful burns to the skin and eyes. The recommendation for TLV-TWA is based on the results of controlled inhalation studies in human volunteers. The limit is thought to minimise the potential for occurrence of dental and/or osteofluorosis (systemic fluorosis) and to prevent the risk of primary irritation to the eyes, nose, throat and lower respiration system.

At concentrations exceeding 3 ppm there have been reports of skin reddening and burning of the nose and eyes.

Odour Safety Factor(OSF)

OSF=71 (HYDROGEN FLUORIDE).

WATER:

- No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



OR

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE

- Safety glasses with side shields.
- 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 lens 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].

HANDS/FEET

- Barrier cream and • Neoprene rubber gloves or • Nitrile rubber gloves • Elbow length PVC gloves.
- Rubber boots • PVC safety gumboots.

OTHER

- Overalls.
 - PVC Apron.
 - PVC protective suit may be required if exposure severe.
 - Eyewash unit.
 - Ensure there is ready access to a safety shower.
- Always ensure that a supply, is on hand, of calcium gluconate gel for treatment of burns and calcium carbonate tablets for accidental ingestion.

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: water, nitric acid, hydrofluoric acid

- Protective Material CPI *

NEOPRENE	A
NATURAL RUBBER	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.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	ABE- AUS P	-
1000	50	-	ABE- AUS P
5000	50	Airline *	-

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

5000	100	-	ABE- 2 P
10000	100	-	ABE- 3 P
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

■ Use in a well-ventilated area.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. 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.

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.)

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

4: Small hood- local control only

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.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Opaque white acidic gel; mixes with water. Pungent acidic odour.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Acid.

Toxic or noxious vapours/gas.

State	Non slump paste	Molecular Weight	Not applicable
Melting Range (°C)	Not available	Viscosity	Not available
Boiling Range (°C)	Not available	Solubility in water (g/L)	Miscible
Flash Point (°C)	Not applicable	pH (1% solution)	Not available.
Decomposition Temp (°C)	Not available	pH (as supplied)	< 1
Autoignition Temp (°C)	Not available	Vapour Pressure (kPa)	Not available
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	1.33- 1.35
Lower Explosive Limit (%)	Not applicable	Relative Vapour Density (air=1)	Not available.
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

Section 10 - STABILITY AND REACTIVITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of heat source
- Presence of incompatible materials
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Severely toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual.

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. Swelling of the epiglottis may make it difficult to breathe which may result in suffocation. More severe exposure may result in vomiting blood and thick mucus, shock, abnormally low blood pressure, fluctuating pulse, shallow respiration and clammy skin, inflammation of stomach wall, and rupture of oesophageal tissue. Untreated shock may eventually result in kidney failure. Severe cases may result in perforation of the stomach and abdominal cavity with consequent infection, rigidity and fever. There may be severe narrowing of the oesophageal or pyloric sphincters; this may occur immediately or after a delay of weeks to years. There may be coma and convulsions, followed by death due to infection of the abdominal cavity, kidneys or lungs.

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. The brain and kidneys may be affected. Other toxic effects include headache, increased saliva output, jerking of the eyeball and dilated pupils, lethargy,

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Section 11 - TOXICOLOGICAL INFORMATION

stupor, coma and rarely, convulsions.

Exposure to nitric acid causes burning pain, severe corrosion and scarring of the gastrointestinal tract, adhesions, stricture-obstruction formation and even pernicious anaemia. Death may be delayed 12 hours to 14 days or several months from these complications, also, vomiting, aspiration, lung inflammation and shock. fatal if swallowed unless immediate treatment is applied.

EYE

■ 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. Severe burns produce long-lasting and possibly irreversible damage. The appearance of the burn may not be apparent for several weeks after the initial contact. The cornea may ultimately become deeply opaque resulting in blindness.

Experiments in which a 20-percent aqueous solution of hydrofluoric acid (hydrogen fluoride) was instilled into the eyes of rabbits caused immediate damage in the form of total corneal opacification and conjunctival ischemia; within an hour, corneal stroma edema occurred, followed by necrosis of anterior ocular structures. Eye contact with both diluted and concentrated nitric acid may result in burns causing pain, adhesions, corneal damage, blindness or permanent eye damage.

The vapour may produce pronounced discomfort of the eyes when present at higher concentrations and this generally gives warning of excessive exposure and the need for control measures to ensure safe working conditions.

SKIN

■ Skin contact with the material may produce severely toxic effects; systemic effects may result following absorption and these may be fatal.

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.

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.

Open cuts, abraded or irritated skin should not be exposed to this material.

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.

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.

Skin contact with nitric acid may cause corrosion, epithelial thickening, yellow discoloration of the skin due to the formation of xanthoproteic acid, blisters and scars depending on the concentration exposed.

INHALED

■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. Swelling of the lungs can occur, either immediately or after a delay; symptoms of this include chest tightness, shortness of breath, frothy phlegm and cyanosis. Lack of oxygen can cause death hours after onset.

Inhalation hazard is increased at higher temperatures.

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. Pre-existing respiratory conditions such as emphysema, bronchitis may be aggravated by exposure. Occupational asthma may result from exposure.

Acute inhalation exposures to hydrogen fluoride (hydrofluoric acid) vapours produce severe eye, nose, and throat irritation; delayed fever, cyanosis, and pulmonary edema; and may cause death.

Even fairly low airborne concentrations of hydrogen fluoride produce rapid onset of eye, nose, and throat irritation. Hydrogen fluoride has a strong irritating odor that is discernible at concentrations of about 0.04 ppm. Higher concentrations of the vapour/ mist may cause corrosion of the throat, nose and lungs, leading to severe inflammation, pulmonary oedema or possible hypocalcaemia.

Vapour concentration of 10 ppm is regarded as intolerable but a vapour concentration of 30 ppm. is considered by NIOSH as: Immediately Dangerous to Life and Health (IDLH).

In humans, inhalation of hydrogen fluoride gas may cause immediate or delayed-onset pulmonary oedema after a 1-hour exposure. In addition, exposure to high concentrations of the vapors of hydrofluoric acid characteristically results in ulcerative tracheobronchitis and haemorrhagic pulmonary edema; this local reaction is equivalent to that caused by gaseous hydrogen chloride. From accidental, occupational, and volunteer exposures, it is estimated that the lowest lethal concentration for a 5-minute human exposure to

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Section 11 - TOXICOLOGICAL INFORMATION

hydrogen fluoride is in the range of 50 to 250 ppm. Significant exposures by dermal or inhalation route may cause hypocalcaemia and hypomagnesaemia; cardiac arrhythmias may follow. Acute renal failure has also been documented after an ultimately fatal inhalation exposure

Fluorides are not bound to any extent to plasma proteins. In human serum the fluoride occurs equally as nonionic and ionic forms. when fluoride intake is high the ionic form predominates.

Repeated sublethal exposures to hydrogen fluoride produce liver and kidney damage.

Rats, rabbits, guinea pigs, and dogs subject to hydrogen fluoride inhalation experienced significant irritation of the conjunctivae, nasal tissues, and respiratory system after acute inhalation exposures at near-lethal levels. Pathological lesions were observed in the kidney and liver, and the severity of the lesions was dose related. The external nares and nasal vestibules were black, and, at dosages causing considerable mortality, those areas showed zones of mucosal and submucosal necrosis.

Inhalation of nitric acid mist or fumes may produce respiratory symptoms. Depending on the concentration and duration of exposure, pulmonary irritation, cough, gagging, chest pain, low body oxygen, pulmonary oedema and damage may occur.

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may produce severely toxic effects. Relatively small amounts absorbed from the lungs may prove fatal.

CHRONIC HEALTH EFFECTS

■ 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 exposure may inflame the skin or conjunctiva.

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

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. Redness, itchiness and allergy-like inflammation of the skin and mouth cavity can occur. The central nervous system may be involved. Prolonged or repeated overexposure to low concentrations of nitric acid vapour may cause chronic bronchitis, corrosion of teeth and also, chemical pneumonitis.

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. Symptoms include spasm and twitching of the muscles, high fever, convulsions and general extreme pain. Inhalation may cause corrosion of the throat, nose and lungs, leading to severe inflammation and lung swelling.

TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

■ The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

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■ Not available. Refer to individual constituents.

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NITRIC ACID:

TOXICITY

Oral (human) LDLo: 430 mg/kg

Inhalation (rat) LC50: 2500 ppm/1h * * DuPont

Unreported (man) LDLo: 110 mg/kg

Inhalation (Cat) LC: 500 mg/m³/4h

Inhalation (Rat) LC50: 130 mg/m³/4h

Oral (Human) LD: 430 mg/kg

Inhalation (Cat) TLo: 300 mg/m³/2h

■ The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

Oral (?) LD50: 50-500 mg/kg *

[Various Manufacturers]

IRRITATION

Nil Reported

HYDROFLUORIC ACID:

TOXICITY

Inhalation (rat) 5: min LC50 4970 ppm

Inhalation (rat) 1: Hour LC50 1310 ppm

Inhalation (human) LCLo: 50 ppm/30m

Inhalation (man) TLo: 100 mg/m³/1m

Inhalation (rat) LC50: 1276 ppm/1h

(liver and kidney damage) [Manufacturer]

for hydrogen fluoride (as vapour)

IRRITATION

Eye (human): 50 mg - SEVERE

WATER:

■ No significant acute toxicological data identified in literature search.

Section 12 - ECOLOGICAL INFORMATION

HYDROFLUORIC ACID:

NITRIC ACID:

■ DO NOT discharge into sewer or waterways.

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

NITRIC ACID:

■ For oxides of nitrogen:

Environmental fate

Oxides of nitrogen are part of the biogeochemical cycling of nitrogen, and are found in air, soil and water. In the atmosphere, oxides of nitrogen are rapidly oxidised to nitrogen dioxide (half-life about 50 days), which dissolves in water to produce dilute nitric acid and precipitates in rain. An increased rate of formation of oxides of nitrogen therefore contributes to 'acid rain'.

In the stratosphere, oxides of nitrogen play a crucial role in maintaining the level of ozone. Ozone is formed through the photochemical reaction of nitrogen dioxide and oxygen. However, too little nitrogen dioxide results in too little ozone being formed, On the other hand, too much nitric oxide reduces the level of ozone because of an increase in the reaction of ozone to convert nitric oxide to nitrogen dioxide.

In the lower atmosphere, oxides of nitrogen play a major role in the formation of photochemical smog in a complex set of reactions that lead to the formation of a variety of nitrated organic compounds (from volatile organic matter) and excessive levels of ozone.

Environmental transport The oxides of nitrogen travel as gases through soil and the atmosphere, and in solution in water in soils, rivers and lakes, and rain and snow.

HYDROFLUORIC ACID:

■ Although small amounts of fluorides are conceded to have beneficial effects, two forms of chronic toxic

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effect, dental fluorosis and skeletal fluorosis may be caused by excessive intake over long periods. 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.

Both hydrogen fluoride and particulate fluorides will be transported in the atmosphere and deposited on land or water by wet and dry deposition. Non-volatile inorganic fluoride particulates are removed from the atmosphere via condensation or nucleation processes. Fluorides adsorbed on particulate matter in the atmosphere are generally stable and are not readily hydrolysed, although they may be degraded by radiation if they persist in the atmosphere. Fluorine and the silicon fluorides (fluosilicates, silicofluorides) are hydrolysed in the atmosphere to form hydrogen fluoride. Hydrogen fluoride may combine with water vapour to produce an aerosol or fog of aqueous hydrofluoric acid. Based upon available data, inorganic fluoride compounds, with the exception of sulfur hexafluoride, are not expected to remain in the troposphere for long periods or to migrate to the stratosphere. Estimates of the residence time of sulfur hexafluoride in the atmosphere range from 500 to several thousand years. Fluoride in aerosols can be transported over large distances by wind or as a result of atmospheric turbulence. The distance travelled is determined by the deposition velocity of both the gaseous hydrogen fluoride and the fluorides in particulate form. Atmospheric fluorides may be transported to soils and surface waters through both wet and dry deposition processes.

Fluorides undergo transformations in soil and water, forming complexes and binding strongly to soil and sediment.

In water, the transport and transformation of inorganic fluorides are influenced by pH, water hardness and the presence of ion-exchange materials such as clays. In natural water, fluoride forms strong complexes with aluminum in water, and fluorine chemistry in water is largely regulated by aluminum concentration and pH. Below pH 5, fluoride is almost entirely complexed with aluminum and consequently, the concentration of free F⁻ is low. As the pH increases, Al-OH complexes dominate over Al-F complexes and the free F⁻ levels increase. Fluoride forms stable complexes with calcium and magnesium, which are present in sea water. Calcium carbonate precipitation dominates the removal of dissolved fluoride from sea water. The residence time for fluoride in ocean sediment is calculated to be 2-3 million years. Fluorosilicic acid and hydrofluoric acid in high aquatic concentrations such as may be found in industrial waste ponds may volatilise, releasing silicon tetrafluoride and hydrogen fluoride into the atmosphere.

Solubilisation of inorganic fluorides from minerals may also be enhanced by the presence of ion-exchange materials (e.g., bentonite clays and humic acid). Once dissolved, inorganic fluorides remain in solution under conditions of low pH and hardness and in the presence of ion-exchange material. Soluble inorganic fluorides may also form aerosols at the air-water interface or vaporise into the atmosphere whereas undissolved species generally undergo sedimentation.

Factors that influence the mobility of inorganic fluorides in soil are pH and the formation of aluminium and calcium complexes. In more acidic soils, concentrations of inorganic fluoride were considerably higher in the deeper horizons. The low affinity of fluorides for organic material results in leaching from the more acidic surface horizon and increased retention by clay minerals and silts in the more alkaline, deeper horizons. The maximum adsorption of fluoride to soil was reported to occur at pH 5.5. In acidic soils with pH below 6, most of the fluoride is in complexes with either aluminium or iron. Fluoride in alkaline soils at pH 6.5 and above is almost completely fixed in soils as calcium fluoride, if sufficient calcium carbonate is available. Fluoride is extremely immobile in soil, as determined by lysimeter experiments.

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 laborers, people living in hot climates, and people with polydipsia will generally have the greatest daily intake of fluorides because they consume greater amounts of water. Foods characteristically high in fluoride content are certain types of fish and seafood (1.9-28.5 mg/kg), especially those types in which the bones are consumed, bone products such as bone meal and gelatin, and tea, which contains approximately 0.52 mg fluoride/cup.

Fluoride is mainly absorbed by the body in the form of hydrogen fluoride, which has a pKa of 3.45. That is, when ionic fluoride enters the acidic environment of the stomach lumen, it is largely converted into hydrogen fluoride. Most of the fluoride that is not absorbed from the stomach will be rapidly absorbed from the small intestine.

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

WATER:

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
nitric acid			LOW	
hydrofluoric acid			LOW	

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise at an effluent treatment plant.
- Use soda ash or slaked lime to neutralise.
- Recycle containers, otherwise dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE, TOXIC

HAZCHEM:

2X (ADG7)

ADG7:

Class or Division:	8	Subsidiary Risk:	6.1
UN No.:	2922	Packing Group:	II
Special Provision:	274	Limited Quantity:	1 L
Portable Tanks & Bulk Containers - Instruction:	T7	Portable Tanks & Bulk Containers - Special Provision:	TP2
Packagings & IBCs - Packing Instruction:	None	Packagings & IBCs - Special Packing Provision:	P001, IBC02

Name and Description: CORROSIVE LIQUID, TOXIC, N.O.S.

Land Transport UNDG:

Class or division:	8	Subsidiary risk:	6.1
UN No.:	2922	UN packing group:	II
Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S. (contains nitric acid hydrofluoric acid)			

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Section 14 - TRANSPORTATION INFORMATION

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	2922	Packing Group:	II
Special provisions:	A3		

Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S. * (CONTAINS NITRIC ACID HYDROFLUORIC ACID)

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	6.1
UN Number:	2922	Packing Group:	II
EMS Number:	F- A , S- B	Special provisions:	274
Limited Quantities:	1 L		

Shipping Name: CORROSIVE LIQUID, TOXIC, N.O.S.

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE S7

REGULATIONS

Regulations for ingredients

nitric acid (CAS: 7697-37-2) is found on the following regulatory lists;

"Australia Exposure Standards", "Australia Hazardous Substances", "Australia High Volume Industrial Chemical List (HVICL)", "Australia Inventory of Chemical Substances (AICS)", "Australia National Pollutant Inventory", "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", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals"

hydrofluoric acid (CAS: 7664-39-3) is found on the following regulatory lists;

"Australia - Queensland Hazardous Materials and Prescribed Quantities for Major Hazard Facilities", "Australia Exposure Standards", "Australia Hazardous Substances", "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 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", "OECD Representative List of High Production Volume (HPV) Chemicals", "The Australia Group Export Control List: Chemical Weapons Precursors"

water (CAS: 7732-18-5) is found on the following regulatory lists;

"Australia Inventory of Chemical Substances (AICS)", "IMO IBC Code Chapter 18: List of products to which the Code does not apply", "International Fragrance Association (IFRA) Survey: Transparency List", "OECD Representative List of High Production Volume (HPV) Chemicals"

No data for S-Weld Clean (CW: 62117)

Section 16 - OTHER INFORMATION

■ 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.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)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.

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Section 16 - OTHER INFORMATION

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This is the end of the MSDS.