Fluorosulfonic acid

sc-235156

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Fluorosulfonic acid

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA


SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
FSO3H, H-F-O3-S, HSO3F, "fluorosulphonic acid", "fluosulfonic acid", "fluorosulfuric acid"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability	0		
Toxicity	2		
Body Contact	4		
Reactivity	2		
Chronic	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

CANADIAN WHMIS CLASSIFICATION

CAS 7789-21-1Fluorosulfonic acid
E-Corrosive Material 1
F-Dangerously Reactive Material 2

EMERGENCY OVERVIEW

RISK

Reacts violently with water.
Harmful by inhalation.
Causes severe burns.
Risk of serious damage to eyes.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ Accidental ingestion of the material may be damaging 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.
■ 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.

EYE

■ The material can produce severe chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.
■ If applied to the eyes, this material causes severe eye damage.
■ Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.
Mild burns of the epithelia generally recover rapidly and completely.
■ 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.

SKIN

■ The material can produce severe chemical burns following direct contactwith the skin.
■ Skin contact is not thought to produce harmful health effects (as classified under EC Directives using animal models).
Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.
■ 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.
■ 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.
■ 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.

INHALED

■ Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
■ The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
There may be dizziness, headache, nausea and weakness.
■ 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.
■ 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.
■ High concentrations cause inflamed airways and watery swellingof the lungs with oedema.

CHRONIC HEALTH EFFECTS

■ 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.
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.
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.
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.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
fluorosulfonic acid	7789-21-1	>98
hydrolyses to give		
hydrogen fluoride	7664-39-3	
sulfuric acid	7664-93-9	
stabilised with		
potassium fluoride	7789-23-3	

Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE
If this product comes in contact with the eyes
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN
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.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.

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.

NOTES TO PHYSICIAN
■ For acute or short term repeated exposures to fluorides
- Fluoride absorption from gastro-intestinal tract may be retarded by calcium salts, milk or antacids.
- Fluoride particulates or fume may be absorbed through the respiratory tract with 20-30% deposited at alveolar level.

- Peak serum levels are reached 30 mins. post-exposure; 50% appears in the urine within 24 hours.
- For acute poisoning (endotracheal intubation if inadequate tidal volume), monitor breathing and evaluate/monitor blood pressure and pulse frequently since shock may supervene with little warning. Monitor ECG immediately; watch for arrhythmias and evidence of Q-T prolongation or T-wave changes. Maintain monitor. Treat shock vigorously with isotonic saline (in 5% glucose) to restore blood volume and enhance renal excretion.

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.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg)	2.475 @ 25 C
Upper Explosive Limit (%)	Not available
Specific Gravity (water=1)	1.743
Lower Explosive Limit (%)	Not available

EXTINGUISHING MEDIA

- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Non combustible.
- Not considered a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of hydrogen fluoride, sulfur oxides (SOx).
May emit corrosive fumes.

FIRE INCOMPATIBILITY

- Keep dry
- NOTE May develop pressure in containers; open carefully. Vent periodically.

None known.

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.

MAJOR SPILLS

- DO NOT touch the spill material
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING To avoid violent reaction, ALWAYS add material to water and NEVER water to material.

RECOMMENDED STORAGE METHODS

- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

<.

- Material is corrosive to most metals, glass and other siliceous materials.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Prince Edward Island Occupational Exposure Limits	fluorosulfonic acid (Fluorides, as F)		2.5						TLV® Basis Bone dam; fluorosis ; BEI
US ACGIH Threshold Limit Values (TLV)	fluorosulfonic acid (Fluorides, as F)		2.5						TLV® Basis Bone dam; fluorosis ; BEI
US - Hawaii Air Contaminant Limits	fluorosulfonic acid (Fluorides (as F))		2.5						(CAS (Varies with compound))
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	fluorosulfonic acid (Fluorides (as F))		2.5						
Canada - Nova Scotia Occupational Exposure Limits	fluorosulfonic acid (Fluorides (as F))		2.5						TLV Basis bone damage; fluorosis. BEI
US - Alaska Limits for Air Contaminants	fluorosulfonic acid (Fluorides (as F))	2.5							
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	fluorosulfonic acid (Fluoride, (as F))		2.5		5				
Canada - Northwest Territories Occupational Exposure Limits	fluorosulfonic acid (Fluoride (as F))		2.5		5				

(English)							
US - Michigan Exposure Limits for Air Contaminants	fluorosulfonic acid (Fluorides (as F))		2.5				
US - Minnesota Permissible Exposure Limits (PELs)	hydrogen fluoride (Hydrogen fluoride (as F))	3		6			
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	hydrogen fluoride (HYDROGEN FLUORIDE)	0.02					
Canada - British Columbia Occupational Exposure Limits	hydrogen fluoride (Hydrogen fluoride, as F)				C 2		
US ACGIH Threshold Limit Values (TLV)	hydrogen fluoride (Hydrogen fluoride, as F)	0.5			2		TLV® Basis URT, LRT, skin & eye irr; fluorosis ; BEI
US NIOSH Recommended Exposure Limits (RELs)	hydrogen fluoride (Hydrogen fluoride)	3	2.5		6	5	(Ceiling ([15-minute]))
Canada - Alberta Occupational Exposure Limits	hydrogen fluoride (Hydrogen fluoride, as F)	0.5	0.4		2	1.6	
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))	3		6			
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))		See Table Z-2				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))	3		6			
US - Idaho - Acceptable Maximum Peak Concentrations	hydrogen fluoride (Hydrogen Fluoride (Z37.26-1969))	3					
US - California Permissible Exposure Limits for Chemical Contaminants	hydrogen fluoride (Hydrogen fluoride, as F)	3	2.5	6			
US - Idaho - Limits for Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))		[2]				
US - Alaska Limits for Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))	3		6			

US - Michigan Exposure Limits for Air Contaminants	hydrogen fluoride (Hydrogen fluoride (as F))	3		6				
US - Hawaii Air Contaminant Limits	hydrogen fluoride (Hydrogen fluoride (as F))	3		6				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	hydrogen fluoride (Hydrogen fluoride)	3	2	3	2			
US - Washington Permissible exposure limits of air contaminants	hydrogen fluoride (Hydrogen fluoride)					3		
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	hydrogen fluoride (Hydrogen fluoride, (as F))	0.5						
Canada - Northwest Territories Occupational Exposure Limits (English)	hydrogen fluoride (Hydrogen fluoride (as F))	3	2.5	6	4.9			
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	hydrogen fluoride (Hydrogen fluoride (Z37.28-1969))	3						
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	hydrogen fluoride (Hydrogen fluoride (as F))					3	2.6	
US - Oregon Permissible Exposure Limits (Z-2)	hydrogen fluoride (Hydrogen fluoride (Z37.28-1969))	3						
Canada - Nova Scotia Occupational Exposure Limits	hydrogen fluoride (Hydrogen fluoride)	0.5				2		Measured as F. TLV Basis upper and lower respiratory tract, skin & eye irritation; fluorosis
Canada - Prince Edward Island Occupational Exposure Limits	hydrogen fluoride (Hydrogen fluoride, as F)	0.5				2		TLV® Basis URT, LRT, skin & eye irr; fluorosis ; BEI

US - Minnesota Permissible Exposure Limits (PELs)	sulfuric acid (Sulfuric acid)		1				
Canada - British Columbia Occupational Exposure Limits	sulfuric acid (Sulfuric acid, Thoracic Revised 2004)		0.2 (M)				A2, 1
US ACGIH Threshold Limit Values (TLV)	sulfuric acid (Sulfuric acid)		0.2				TLV® Basis Pulm func
US NIOSH Recommended Exposure Limits (RELs)	sulfuric acid (Sulfuric acid)		1				
Canada - Alberta Occupational Exposure Limits	sulfuric acid (Sulphuric acid)		1		3		
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	sulfuric acid (Sulfuric acid)		1				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1				
US - Idaho - Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1				
US - California Permissible Exposure Limits for Chemical Contaminants	sulfuric acid (Sulfuric acid)		1		3		
US - Hawaii Air Contaminant Limits	sulfuric acid (Sulfuric acid)		1		3		
US - Alaska Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1				
US - Michigan Exposure Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1				
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	sulfuric acid (Sulphuric acid)	-	1	-	1		
US - Washington Permissible exposure limits of air contaminants	sulfuric acid (Sulfuric acid)		1		3		

Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sulfuric acid (Sulphuric acid, (thoracic fraction++))		0.2	0.6	T20, strong acid mists only
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	sulfuric acid (Sulfuric acid)		1		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sulfuric acid (Sulfuric acid)		1	3	
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfuric acid (Sulfuric acid)		1		
Canada - Prince Edward Island Occupational Exposure Limits	sulfuric acid (Sulfuric acid)		0.2		TLV® Basis Pulm func
US - Oregon Permissible Exposure Limits (Z-1)	sulfuric acid (Sulfuric acid)	-	1		
Canada - Northwest Territories Occupational Exposure Limits (English)	sulfuric acid (Sulphuric acid)		1	3	
Canada - Nova Scotia Occupational Exposure Limits	sulfuric acid (Sulfuric acid)		0.2		TLV Basis pulmonary function. A2 = as contained in strong inorganic acid mists
US - Hawaii Air Contaminant Limits	potassium fluoride (Platinum (as Pt) - Metal)		1		
Canada - Alberta Occupational Exposure Limits	potassium fluoride (Fluorides, as F)		2.5		
US OSHA Permissible Exposure Levels (PELs) - Table Z2	potassium fluoride (Fluoride as dust (Z37.28–1969))		2.5		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	potassium fluoride (Fluorides (as F))		2.5		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	potassium fluoride (Fluorides (as F))		2.5		

US - California Permissible Exposure Limits for Chemical Contaminants	potassium fluoride (Fluorides, as F)		2.5				
Canada - British Columbia Occupational Exposure Limits	potassium fluoride (Fluorides (as F))		2.5				
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	potassium fluoride (Fluoride as dust (Z37.28-1969))		2.5				
US - Oregon Permissible Exposure Limits (Z-1)	potassium fluoride (Fluorides (As F))	-	2.5				(See Oregon Table Z-2)
US - Oregon Permissible Exposure Limits (Z-2)	potassium fluoride (Fluoride as dust (Z37.28-1969))		2.5				
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	potassium fluoride (Fluorides (as F))		2.5				
US - Washington Permissible exposure limits of air contaminants	potassium fluoride (Fluorides (as F))		2.5		5		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	potassium fluoride (Fluoride (as F))	-	2.5	-	2.5		
US - Minnesota Permissible Exposure Limits (PELs)	potassium fluoride (Fluorides (as F))		2.5				
US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	potassium fluoride (Fluorides (as F))	2.5					
US - Idaho - Limits for Air Contaminants	potassium fluoride (Fluorides (as F))		2.5				

PERSONAL PROTECTION




RESPIRATOR

- Type BE-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure
- Chemical goggles.whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.

HANDS/FEET

- Elbow length PVC gloves
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity
- Neoprene rubber gloves

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

ENGINEERING CONTROLS

■ Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Corrosive.
Acid.
Reacts violently with water.

State	Liquid	Molecular Weight	100.07
Melting Range (°F)	-87-3	Viscosity	Not Available
Boiling Range (°F)	330	Solubility in water (g/L)	Reacts violently
Flash Point (°F)	None	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	2.475 @ 25 C
Upper Explosive Limit (%)	Not available	Specific Gravity (water=1)	1.743
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	3.5
Volatile Component (%vol)	Not available	Evaporation Rate	Not available

APPEARANCE
Liquid with pungent odor; reacts violently with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
- Contact with alkaline material liberates heat

STORAGE INCOMPATIBILITY
- Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
- Inorganic acids neutralise chemical bases (for example amines and inorganic hydroxides) to form salts - neutralisation can generate dangerously large amounts of heat in small spaces.
- The dissolution of inorganic acids in water or the dilution of their concentrated solutions with additional water may generate significant heat.
- The addition of water to inorganic acids often generates sufficient heat in the small region of mixing to cause some of the water to boil explosively. The resulting "bumping" can spatter the acid.
- Reacts vigorously with alkalis
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.

Hydrogen fluoride
- reacts violently with strong oxidisers, acetic anhydride, alkalis, 2-aminoethanol, arsenic trioxide (with generation of heat), bismuthic acid, calcium oxide, chlorosulfonic acid, cyanogen fluoride, ethylenediamine, ethyleneimine, fluorine (fluorine gas reacts vigorously with a 50% hydrofluoric acid solution and may burst into flame), nitrogen trifluoride, N-phenylazopiperidine, oleum, oxygen difluoride, phosphorus pentoxide, potassium permanganate, potassium tetrafluorosilicate(2-), beta-propiolactone, propylene oxide, sodium, sodium tetrafluorosilicate, sulfuric acid, vinyl acetate
- reacts (possibly violently) with aliphatic amines, alcohols, alkanolamines, alkylene oxides, aromatic amines, amides, ammonia, ammonium hydroxide, epichlorohydrin, isocyanates, metal acetylides, metal silicides, methanesulfonic acid, nitrogen compounds, organic anhydrides, oxides, silicon compounds, vinylidene fluoride
- attacks glass and siliceous materials, concrete, ceramics, metals (flammable hydrogen gas may be produced), metal alloys, some plastics, rubber coatings, leather, and most other materials with the exception of lead, platinum, polyethylene, wax.
- Segregate from alcohol, water.
- NOTE May develop pressure in containers; open carefully. Vent periodically.

Fluorosulfonic acid
- reacts violently with moisture generating hydrogen fluoride and sulfuric acid
- is a strong acid in solution
- aqueous solutions are incompatible with sulfuric acid, alkalis, ammonia, aliphatic amines, alkanolamines, alkylene oxides, amides, epichlorohydrin, organic anhydrides, isocyanates, vinyl acetates
- increase the explosive sensitivity of nitromethane

Reacts with mild steel and zinc to produce hydrogen (H2).

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

Section 11 - TOXICOLOGICAL INFORMATION

fluorosulfonic acid

TOXICITY AND IRRITATION
■ 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.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.
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.
No significant acute toxicological data identified in literature search.

CARCINOGEN

Fluorides, as F	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
fluorosulfonic acid	US - Maine Chemicals of High Concern List	Carcinogen	A4
fluorosulfonic acid	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis Bone dam; fluorosis ; BEI

Acid mists, strong inorganic	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Fluorides (inorganic, used in drinking-water)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3
hydrogen fluoride	US - Rhode Island Hazardous Substance List	IARC	
hydrogen fluoride	US - Maine Chemicals of High Concern List	Carcinogen	A4
hydrogen fluoride	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis Bone dam; fluorosis ; BEI
hydrogen fluoride	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis bone damage; fluorosis. BEI
Strong-inorganic-acid mists containing sulfuric acid (see Acid mists)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	
Sulfuric acid	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A2
sulfuric acid	US - Rhode Island Hazardous Substance List	IARC	
STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
sulfuric acid	US - Maine Chemicals of High Concern List	Carcinogen	A2
sulfuric acid	US - Maine Chemicals of High Concern List	Carcinogen	CA Prop 65; IARC; NTP 11th ROC
sulfuric acid	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis Pulm func
sulfuric acid	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis pulmonary function. A2 = as contained in strong inorganic acid mists
potassium fluoride	US - Rhode Island Hazardous Substance List	IARC	
potassium fluoride	US - Maine Chemicals of High Concern List	Carcinogen	A4
potassium fluoride	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV® Basis Bone dam; fluorosis ; BEI
potassium fluoride	Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens	Notes	TLV Basis bone damage; fluorosis. BEI

SKIN

hydrogen fluoride	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes
hydrogen fluoride	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV® Basis URT, LRT, skin & eye irr; fluorosis ; BEI
hydrogen fluoride	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	Yes
hydrogen fluoride	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	Yes
hydrogen fluoride	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	Yes

Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
hydrogen fluoride	No Data Available	No Data Available	LOW	
sulfuric acid	No Data Available	No Data Available	LOW	
potassium fluoride	No Data Available	No Data Available	LOW	

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)
B. Component Waste Numbers
When hydrogen fluoride is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U134 (waste code C,T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
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.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

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.

- 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.

For small quantities:

- Neutralise an aqueous solution of the material.
- Filter solids for disposal to approved land fill.
- Flush solution to sewer (subject to local regulation)
- Heat and fumes evolved during reaction may be controlled by rate of addition.

For small quantities:

- Cautiously dissolve in water
- Neutralise with sodium carbonate or if product does not dissolve completely add a small quantity of hydrochloric acid followed by sodium carbonate
- Add excess calcium chloride to precipitate the fluoride and/ or carbonate
- Remove solids to site approved for hazardous waste

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	8
Identification Numbers:	UN1777	PG:	I
Label Codes:	8	Special provisions:	A3, A6, A7, A10, B6, B10, N3, N36, T10, TP2
Packaging: Exceptions:	None	Packaging: Non-bulk:	201
Packaging: Exceptions:	None	Quantity limitations: Passenger aircraft/rail:	0.5 L
Quantity Limitations: Cargo aircraft only:	2.5 L	Vessel stowage: Location:	D
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:
Fluorosulfonic acid

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	1777	Packing Group:	I
Special provisions:	None		
Cargo Only			
Packing Instructions:	854	Maximum Qty/Pack:	2.5 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	850	Maximum Qty/Pack:	0.5 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Forbidden	Maximum Qty/Pack:	Forbidden

Shipping name:FLUOROSULPHONIC ACID

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	1777	Packing Group:	I
EMS Number:	F-A,S-B	Special provisions:	None
Limited Quantities:	0		

Shipping name:FLUOROSULPHONIC ACID

Section 15 - REGULATORY INFORMATION

fluorosulfonic acid (CAS: 7789-21-1) is found on the following regulatory lists;
"Canada Ingredient Disclosure List (SOR/88-64)","Canada Non-Domestic Substances List (NDSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US - Delaware Pollutant Discharge Requirements - Reportable Quantities","US - Massachusetts Oil & Hazardous Material List","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US EPA Acute Exposure Guideline Levels (AEGLs) - Holding","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

Regulations for ingredients

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

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Environmental Quality Guidelines (EQGs) Air","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","The Australia Group Export Control List: Chemical Weapons Precursors","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Delaware Pollutant Discharge Requirements - Reportable Quantities","US - Hawaii Air Contaminant Limits","US - Idaho - Acceptable Maximum Peak Concentrations","US - Idaho - Limits for Air Contaminants","US - Louisiana Minimum Emission Rates Toxic Air Pollutants","US - Louisiana Toxic Air Pollutant Ambient Air Standards","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","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","US - Vermont Hazardous Constituents","US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either","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 Dangerous waste constituents list","US - Washington Discarded Chemical Products List - ""U"" Chemical Products","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wisconsin Control of Hazardous Pollutants - Emission Thresholds, Standards and Control Requirements (Hazardous Air Contaminants)","US - Wisconsin Control of Hazardous Pollutants - Substances of Concern for Sources of Incidental Emissions of Hazardous Air Contaminants","US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives","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 ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US CERCLA Priority List of Hazardous Substances","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US NIOSH Recommended Exposure Limits (RELs)","US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US OSHA Permissible Exposure Levels (PELs) - Table Z2","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

sulfuric acid (CAS: 7664-93-9) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives","Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Industrial Hazardous Substances","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada CEPA Environmental Registry Substance Lists - List of substances on the DSL that meet the human health criteria for categorization (English)","Canada Controlled Drugs and Substances Act Schedule VI","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","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 Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Air Transport Association (IATA) Dangerous Goods Regulations","International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List","International Council of Chemical Associations (ICCA) - High Production Volume List","United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II","United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control (Red List) - Table II","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Priority List for the Development of NSRLs for Carcinogens","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Delaware Pollutant Discharge Requirements - Reportable Quantities","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Louisiana Minimum Emission Rates Toxic Air Pollutants","US -

Louisiana Toxic Air Pollutant Ambient Air Standards","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wisconsin Control of Hazardous Pollutants - Emission Thresholds, Standards and Control Requirements (Hazardous Air Contaminants)","US - Wisconsin Control of Hazardous Pollutants - Substances of Concern for Sources of Incidental Emissions of Hazardous 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 CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPA Acute Exposure Guideline Levels (AEGLs) - Interim","US EPA High Production Volume Chemicals Additional List","US EPCRA Section 313 Chemical List","US FDA CFSAN GRAS Substances evaluated by the Select Committee on GRAS Substances (SCOGS)","US FDA Indirect Food Additives: Adhesives and Components of Coatings - Substances for Use Only as Components of Adhesives - Adhesives","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

potassium fluoride (CAS: 7789-23-3,13455-21-5) is found on the following regulatory lists;

"Canada - Saskatchewan Industrial Hazardous Substances","Canada Domestic Substances List (DSL)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","The Australia Group Export Control List: Chemical Weapons Precursors","US - New Jersey Right to Know Hazardous Substances","US DOE Temporary Emergency Exposure Limits (TEELs)","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Ingestion may produce health damage*.
■ Cumulative effects may result following exposure*.
* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name	CAS
potassium fluoride	7789-23-3, 13455-21-5

■ 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.

Issue Date: Dec-24-2009
Print Date:Jan-25-2012