

Material Safety Data Sheet

HYDROFLUORIC ACID

Print Date: March 2004

SECTION 1 – Chemical Product and Company Identification

MSDS Name: HYDROFLUORIC ACID

MSDS Preparation Date: 02-2004, Supersedes 02-2001, 02-98

Synonyms or Generic ID: Fluohydric acid, fluoric acid, hydrofluoric acid solution

Seastar Product Codes: IQ-05-0500, IQ-05-4000, IQ-05-200L, BA-05-0250, BA-05-0500, BA-05-1000, BA-05-2000, OF-05-4000, PDV-05-REFILL

Canadian TDG Classification: 8 6.1 PKG Gr II

Formula: HF

PIN (UN# / NA#): UN1790

Molecular Wt: 20.01

Canadian WHMIS Class: Class E; Class D Div 1 Sub A; Class D Div 2 Sub A

Supplier: Seastar Chemicals Inc, PO Box 2219, 2045 Mills Road West, Sidney, BC, Canada V8L 3S8

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SECTION 2 – Composition/Information on Ingredients

CAS #	Chemical Name	Percent	EINECS/ELINCS	TLV	Hazard
7732-18-5	Water	Balance	231-791-2	N/av	None
7664-39-3	Hydrofluoric acid	47-51%	231-634-8	ACFIH – as F: 2.5 mg/m ³ TWA (listed under FLUORIDES); NIOSH – as F: 3 ppm TWA; 2.5 mg/m ³ TWA; C 6 ppm (15 min); c 5 mg/m ³ (15 min); OSHA – 3 ppm TWA	Corrosive

Hazard Symbols: T+ C Risk Phrases: 26/27/28 35

SECTION 3 – Hazards Identification

EMERGENCY OVERVIEW

Colourless liquid with a pungent, irritating, penetrating odour. Concentrations above 40% fume in air. Will not burn. Cylinders or tanks may rupture and explode if heated. Highly reactive. Contact with metals, such as iron or steel, slowly releases flammable and potentially explosive hydrogen gas. VERY TOXIC. May be fatal if inhaled, absorbed through the skin or swallowed. CORROSIVE to the nose, throat and respiratory tract. Causes lung injury-effects may be delayed. CORROSIVE to the eyes and skin. Causes severe burns. May cause blindness and permanent scarring. Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, nausea, dizziness, vomiting and seizures. Long-term exposure may cause skeletal fluorosis (weakened bone structure).

Target Organs: Lungs, teeth, eyes, skin, bone, mucous membranes.

Potential Health Effects

Primary Route(s) of Entry: Inhalation and ingestion. Skin contact. Eye contact. Skin absorption.

Effects of Acute Exposure: May be fatal by ingestion, inhalation or skin absorption. Corrosive. Acute effects may be delayed.

LD50/LC50: CAS# 7732-18-3: Oral, rat: LD50 = >90 mL/kg. CAS# 7664-39-3: Inhalation, mouse: LC50 = 342 ppm/1H. Inhalation, rate: LC50 = 1276 ppm/1H.

Eyes: Contact with liquid or vapor can cause irritation or severe burns or conjunctivitis, and possible irreversible eye damage. Solutions as dilute as 2% or lower may cause burns.

Skin: Both liquid and vapour can cause severe burns, which may not be immediately painful or visible. May be fatal if absorbed through the skin. Causes severe burns with delayed tissue destruction. Substance is rapidly absorbed through the skin. Penetration may continue for several days. Causes severe tissue necrosis and bone destruction. May cause hypocalcemia and death. Solutions as dilute as 2% or lower may cause burns. LD50: skin-mouse 500 mg/kg.

Ingestion: Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause systemic toxic effects on the heart, liver, and kidneys. Depletes calcium levels in the body which, if left untreated, can lead to hypocalcemia and death.

Inhalation: May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation. May cause pulmonary edema and severe respiratory disturbances. Depletes calcium levels in the body which can lead to hypocalcemia and death.

Effects of Chronic Exposure: Acute exposure above 5 ppm may irritate eyes and respiratory tract. Also causes severe eye and skin burns. Repeated inhalation may cause osteofluorosis and permanent respiratory damage. Prolonged or repeated exposure may cause

permanent bone structure abnormalities. To the best of our knowledge, the chronic toxicity of this substance has not been fully investigated.

SECTION 4 – First Aid Measures

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes, holding the lids apart to ensure flushing of the entire surface. Get competent medical aid immediately. If a physician is not immediately available, apply one or two drops of 0.5 tetracaine hydrochloride solution followed by a second irrigation for at least 15 minutes or until a physician is available.

Skin: Get medical aid immediately. Rinse area with copious quantities of water for at least 15 minutes. Remove contaminated clothing and shoes.

FIRST AID: (SKIN ONLY) IF AVAILABLE, AFTER THOROUGH WASHING (PREFERRED METHOD), A 2.5% CALCIUM GLUCONATE GEL SHOULD BE APPLIED TO THE BURNED AREA, [OR] THE BURNED AREA SHOULD BE IMMERSSED IN A SOLUTION OF 0.2% ICED AQUEOUS BENZETHONIUM CHLORIDE, OR 0.13% ICED AQUEOUS BENZALKONIUM CHLORIDE. IF IMMERSION IS NOT PRACTICAL, TOWELS SHOULD BE SOAKED WITH ONE OF THE ABOVE SOLUTIONS AND USED AS COMPRESSES FOR THE BURNED AREA. IDEALLY, COMPRESSES SHOULD BE CHANGED EVERY TWO MINUTES. IT IS SUGGESTED THAT A CERTAIN QUANTITY OF EITHER PREPARED SOLUTION OR THE CALCIUM GLUCONATE GEL BE KEPT ON HAND AT ALL TIMES. SOLUTIONS SHOULD BE REPLACED ANNUALLY IF NOT PREVIOUSLY USED.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately. Never give anything by mouth to an unconscious person.

Inhalation: Remove patient from exposure to fresh air immediately. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician. Keep patient lying down, quiet and warm.

Notes to Physician: Due to delayed and persistent symptoms, observe patient closely for 48 hours. Prompt action is essential in all cases of contact.

Antidote: Always have calcium gluconate gel on hand. The use of infiltration therapy and intraarterial therapy for hydrofluoric acid burns resulting from concentrations greater than 20% should be made by qualified medical personnel. Calcium gluconate may be administered intravenously slowly to bind to the fluoride ion. This administration needs to be monitored under the supervision of a physician.

SECTION 5 – Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water Reactive. Material will react with water and may release a flammable and/or toxic gas. Wear appropriate protective clothing to prevent contact with skin and eyes. Wear a self-contained breathing apparatus (SCBA) to prevent contact with thermal decomposition products. Reacts with most metals to form highly flammable hydrogen gas, which can form explosive mixtures with air.

Extinguishing Media: Use water spray to cool fire-exposed containers. Substance is non-flammable; use agent most appropriate to extinguish surrounding fire.

Auto-ignition Temperature: Not available.

Flash Point: Not available.

NFPA Rating: NFPA Hazard Rating: Health – 4; Flammability – 0; Reactivity – 1.

Explosion Limits: Lower: Not available. Upper: Not available.

SECTION 6 – Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches, which lead to waterways. Wear a self-contained breathing apparatus and appropriate personal protection (see Exposure Controls, Personal Protection section 8). Neutralize spill with sodium bicarbonate. Use water spray to disperse the gas/vapor. Remove all sources of ignition.

Steps to be taken in case material is released or spilled: Wear full protective equipment. Contain spills and cautiously dilute with large excess of water. Neutralize carefully with soda ash or lime. Material will fume during neutralization; approach from upwind. Provide good ventilation. Flush residue in accordance with applicable disposal regulations.

Waste disposal method: According to all applicable regulations. Avoid runoff.

SECTION 7 – Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before re-use. Use with adequate ventilation. Do not get on skin or in eyes. Do not ingest or inhale.

Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in metal or glass containers. Do not store in direct sunlight. Keep tightly closed. Empty container may contain hazardous residue. Do not add any other material to the container. Do not wash down the drain. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage

and handling practices. Do not allow smoking or food consumption while handling. Store in approved containers only. Do not add water to acids. Instead, dilute by adding acid to water cautiously and with agitation.

Storage Code: White.

SECTION 8 – Exposure Control/Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Exposure Limits:

Chemical Name	ACGH	NIOSH	OSHA
Water	None listed.	None listed.	None listed.
Hydrofluoric acid	As F: 2.5 mg/m ³ TWA (listed under FLUORIDES)	As F: 3 ppm TWA; 2.5 mg/m ³ TWA; C 6 ppm (15 min); C 5 mg/m ³ (15 min)	3 ppm TWA

OSHA Vacated PELs Hydrofluoric acid: as F: 3 ppm TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133. Wear face shield.

Skin: Wear appropriate protective neoprene gloves to prevent skin exposure. Wear acid-resistant jacket, trousers and boots sufficient to protect skin.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respiratory Protection: Wear appropriate OSHA/MSHA approved chemical cartridge respirator regulations found in 29CFR 1910.134. If more than TLV, do not breathe vapour. Wear self-contained breathing apparatus. Always use an NIOSH-approved respirator when necessary.

Ventilation: Use only in a chemical fume hood. Adequate ventilation to maintain vapour/dust below TLV.

Other Protective Equipment: Make eye bath and emergency shower available.

SECTION 9 – Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: strong odor

pH: <0.2

Vapor Pressure: No information available.

Vapor Density: 2.21 (Air=1)

Evaporation Rate: No information available.

Viscosity: No information available.

Boiling Point: 225°F

Freezing/Melting Point: -37°F

Decomposition Temperature: No information available.

Solubility: Soluble in water.

Specific Gravity/Density: 1.2 (Water=1).

Molecular Formula: HF

Molecular Weight: 20.0054

SECTION 10 – Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Incompatible materials, metals.

Incompatibilities with Other Materials: Substance is incompatible with over 35 specific chemicals. Please refer to the NFPA Fire Protection Guide for specifics. Heat, Glass, concrete and other silicon-bearing materials will yield silicon tetrafluoride. Pressure build-up from this process has been known to blow up glass containers. Carbonates, sulphides, and cyanides will yield toxic gases such as carbon dioxide, hydrogen sulphide and hydrogen cyanide. Alkalis, some oxides, fluorine and other water-reactive materials will cause strong exothermic reactions that can be violent. Reacts with most common metals to produce hydrogen. Is corrosive to many materials, including leather, rubber and many organics.

Hazardous Decomposition Products: Fluoride fumes.

Hazardous Polymerization: Has not been reported.

SECTION 11 – Toxicological Information

RTECS: CAS# 7732-18-5: ZC0110000. CAS# 7664-39-3: MW7875000.

LD50/LC50: CAS# 7732-18-3: Oral, rat: LD50 = >90 mL/kg.

CAS# 7664-39-3: Inhalation, mouse: LC50 = 342 ppm/1H.

Inhalation, rate: LC50 = 1276 ppm/1H.

Carcinogenicity: CAS# 7732-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65. CAS# 7664-39-3: ACGIH: Not listed. California: Not listed. NIOSH: Not listed. NTP: Not listed. OSHA: Not listed. IARC: [present]

(when used in drinking water) (listed as 'FLUORIDES, INORGANIC').

Epidemiology: No information available.

Teratogenicity: Embryo or fetus: death, ihl-rat TClO=4980 ug/m³/4H (1-22 D preg).

Reproductive: Fertility: post-implantation mortality and pre-implantation mortality, ihl-rat TClO=470 uf/m³/4H.

Mutagenicity: DNA Damage: D. melanogaster-ihl 1300 ppb/6W Sex Chromosome Loss/Non-disjunction: D. melanogaster-ihl 2900 ppb.

Neurotoxicity: No information available.

SECTION 12 – Ecological Information

Ecotoxicity: No information available. Fish (fresh water) 60 ppm lethal (time period not specified).

Environmental: No information reported. **Physical:** No information available **Other:** None.

SECTION 13 – Disposal Considerations

Dispose of in a manner consistent with federal, provincial/state/territorial, and local regulations.

RCRA D-Maximum Concentration of Contaminants: None of the components are on this list.

RCRA D Series – Chronic Toxicity Reference Levels: None of the components are on this list.

RCRA F Series Wastes: None of the components are on this list.

RCRA P Series Wastes: None of the components are on this list.

RCRA U Series Wastes: CAS# 7664-39-3: waste number U134 (Corrosive waste, Toxic waste).

RCRA Substances Banned from Land Disposal: CAS# 7664-39-3 is banned from land disposal according to RCRA.

SECTION 14 – Transport Information

Proper Shipping Name: HYDROFLUORIC ACID, 60% or less strength

Hazard Class: 8 (6.1)

UN Number: UN1790

Packing Group: II

SECTION 15 – Regulatory Information

US Federal

TSCA: CAS# 7732-18-5 is listed on the TSCA Inventory. CAS# 7664-39-3 is listed on the TSCA Inventory.

Health and Safety Reporting List: None of the components are on this list.

Chemical Test Rules: None of the components are on this list.

TSCA Section 12b: None of the components are on this list.

TSCA Significant New Use Rule (SNUR): None of the components are on this list.

CERCLA Reportable Quantities (RQ): CAS# 7664-39-3: final RQ = 100 pounds (45.4 kg).

SARA Threshold Planning Quantities (TPQ): CAS# 7664-39-3: TPQ = 100 pounds.

SARA Hazard Categories: CAS# 7664-39-3: acute, chronic.

SARA Section 313: This material contains Hydrofluoric acid (CAS# 7664-39-3, 48-50%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

US State

State Right to Know: Hydrofluoric acid can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California Prop 65: No information available.

California No Significant Risk Level: No information available.

European/International Regulations

European Labelling in Accordance with EC Directives:

Hazard Symbols: T+ C

Risk Phrases: R 35 Causes severe burns.

R 35 Causes severe burns.

Safety Phrases: S 7/9 Keep container tightly closed and in a well-ventilated place.

Clean Air Act – Hazardous Air Pollutants (HAPs): CAS# 7664-39-3 is listed as a hazardous air pollutant (HAP).

Clean Air Act – Class 1 Ozone Depletors: None of the components are on this list.

Clean Air Act – Class 2 Ozone Depletors: None of the components are on this list.

Clean Water Act – Hazardous Substances: CAS# 7664-39-3 is listed as a Hazardous Substance under the CWA.

Clean Water Act – Priority Pollutants: None of the components are on this list.

Clean Water Act – Toxic Pollutants: None of the components are on this list.

OSHA – Highly Hazardous: CAS #7664-39-3 is considered highly hazardous by OSHA.

S 25 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36/37 Wear suitable protective clothing and gloves.

WGKK (Water Danger/Protection): No information available.

Canadian DSL/NDSL: CAS# 7732-18-5 is listed on Canada's DSL/NDSL List.

CAS# 7664-39-3 is listed on Canada's DSL/NDSL List.

Canadian WHMIS Classification: This product has a WHMIS classification of D1A, E.

Canada Ingredient Disclosure List: CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

CAS# 7664-39-3 is listed on Canada's Ingredient Disclosure List.

Exposure Limits: OES-United Kingdom: TWA (listed as FLUORIDES): as F: 2.5 mg/m³ TWA. OES-United Kingdom: STEL as F: 3 ppm STEL; 2.5 mg/m³ STEL.

SECTION 16 – Other Information

The statements contained herein are offered for informational purposes only and are based upon technical data. Seastar Chemicals Inc believes them to be accurate but does not purport to be all-inclusive. The above-stated product is intended for use only by persons having the necessary technical skills and facilities for handling the product at their discretion and risk. Since conditions and manner of use are outside our control, we (Seastar Chemicals Inc) make no warranty of merchantability or any such warranty, express or implied with respect to information and we assume no liability resulting from the above product or its use. Users should make their own investigations to determine suitability of information and product for their particular purposes.