SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name: Hydrofluoric acid

CAS number: 7664-39-3

Synonyms: Fluorohydric Acid, Fluoric Acid, Hydrogen Fluoride Solution

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

Identified uses: Process chemical, laboratory and scientific research and development

1.3 Details of the supplier of the safety data sheet

Company: Lab Alley, LLC
12501 Pauls Valley Road, Suite A
Austin, Texas 78737
U.S.A.

Telephone: 512-668-9918
Fax: 512-886-4008

1.4 Emergency telephone

Emergency Phone # US & Canada: 1-800-535-5053 INFOTRAC
International: 1-352-323-3500 INFOTRAC

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute Dermal Toxicity (Category 1)
Acute Inhalation Toxicity (Category 2)
Acute Oral Toxicity (Category 2)
Eye Damage (Category 1)
Skin Corrosion (Category 1A)

2.2. GHS Label elements, including precautionary statements

Pictogram

Signal Word: **Danger!**

Hazard statement(s): Fatal if swallowed. Fatal in contact with skin. Causes severe skin burns and eye damage. Fatal if inhaled.

Precautionary statement(s): **Prevention** - Do not breathe mist or vapors. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye protection and face protection. In case of inadequate ventilation wear respiratory protection. **Response** - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call POISON CENTER or doctor. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call POISON CENTER or doctor. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. Immediately call POISON CENTER or doctor. IF SWALLOWED: Immediately call a POISON CENTER or doctor. Rinse mouth.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Burns may not be immediately painful or visible. Medical treatment is required for all incidents of contact or exposure.

SECTION 3: Composition/information on ingredients

3.1 Components

Ingredient	CAS Number	Percent	Hazardous Chemical
Water	7732-18-5	51-52%	No
Hydrogen Fluoride	7664-39-3	48-49%	Yes

*The specific identity and/or exact percentage of the composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled: Remove to fresh air. If not breathing use artificial respiration. If breathing is difficult, have qualified personnel administer oxygen. Do NOT allow the victim to move around unnecessarily. Get immediate medical attention. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. In addition to standard first aid, trained personnel should administer a nebulized solution of 2.5% calcium gluconate with oxygen.

In case of skin contact:

Prevent direct contact. Wear chemical protective clothing if necessary. As quickly as possible remove contaminated clothing. Shoes, and leather goods (e.g. watchbands, belts). As quickly as possible, flush with lukewarm, gently flowing water for 5 minutes. Immediately after washing, use one of the following measures:

a. Begin soaking the affected areas in iced 0.13% benzalkonium chloride (Zephiran®) solution. Use ice cubes, not shaved ice, to prevent frostbite. If immersion is not practical, towels should be soaked with iced 0.13%benzalkonium chloride (Zephiran®) solution and used as a compress for the burned area. Compresses should be changed every two to four minutes. Benzalkonium chloride (Zephiran®) soaks or compresses should be continued until medical attention is available.

b. Wearing chemical protective gloves start massaging 2.5% calcium gluconate gel into the burn site. Apply gel frequently and massage continuously until medical attention is available.

*If benzalkonium chloride (Zephiran®) or calcium gluconate gel is not available, water rinsing must continue until medical treatment is available. Double bag, label and seal contaminated clothing, shoes and leather goods at the scene for safe disposal.

In case of eye contact:

Avoid direct contact. Wear chemical protective gloves if necessary. Immediately flush the eye with tepid water for at least 15-20 minutes, while holding the eyelid(s) open. If a contact lens is present, DO NOT delay irritation or attempt to remove the lens. Take care not to rinse contaminated water into the unaffected eye or onto the face. Do not use benzalkonium chloride (Zephiran®) for eye contact. If sterile 1%calcium gluconate solution is available, limit flushing time to 5 minutes. Then, repeatedly irrigate the eye using a syringe filled with 1% calcium gluconate solution. Get immediate medical attention.

If ingested:

Immediately contact your poison control center or emergency department. If conscious and responsive, give the victim a fluoride binding substance such as milk (1/2-1 glassful), chewable calcium carbonate tablets or milk of magnesia. Avoid large amounts of liquid as this may cause vomiting. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have the victim lean forward to reduce the risk of aspiration. Get immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Causes severe burns to the eyes, skin, digestive tract and respiratory tract. Burns may not be immediately painful or visible. Fatal in contact with skin, if swallowed, or inhaled. May cause damage to the respiratory tract and lungs if inhaled.

4.3 Indication of any immediate medical attention and special treatment needed

Immediate medical attention is required for all incidents of contact or exposure. For eye contact: Carefully evaluate for eye damage, exposure to dilute solutions may result in delayed symptoms of ocular damage. For skin contact: Decontamination of the contact area is of primary importance. Symptoms may be delayed for several hours. Specific treatment is controversial with no single treatment clearly superior. Topical calcium gluconate gel or magnesium oxide pastes have been successful. Calcium gluconate infiltration may be considered in some cases. Systemic absorption may occur and may require treatment with parenteral calcium salts. For ingestion: Administer fluoride binding substance. Monitor and treat hypocalcemia and hypomagnesemia, parenterally as needed. Observe and evaluate patient for oral and GI burns. For inhalation: Monitor for respiratory distress. Respiratory symptoms may be delayed up to 48 hours. Refer to poison center for the most recent recommendations.

4.4 Medical Surveillance

Provide physical examinations of exposed personnel ever six months including fluoride determinations in urine, studies of liver and kidney function: chest X-ray, annually. Protect from exposure those individuals with diseases of kidneys, liver, and lung. (ITII. Toxic and Hazardous Industrial Chemicals safety Manual.)

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable (and unsuitable) extinguishing media

This product is not combustible. Use any extinguishing media that is suitable for the surrounding fire. Water spray may be used to keep fire exposed containers cool. Avoid getting water inside containers.

5.2 Specific hazards arising from the substance or mixture

This product may react with most metals to form flammable and explosive hydrogen gas. This product is a strong acid which can react with combustible materials and may cause fire. Thermal decomposition may release oxides of fluorine, hydrogen fluoride, and hydrogen.

5.3 Special protective equipment and precautions for firefighters

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

5.4 Further information

None.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

6.2 Environmental precautions

No data available.

6.3 Methods and materials for containment and cleaning up

Apply magnesium sulfate (dry) to the spill area. Follow up with inert absorbent and add soda ash or magnesium oxide and slaked lime. Collect in appropriate plastic containers and save for disposal. Wash spill site with soda ash solution. NOTE: Porous materials (concrete, wood, plastic, etc.) will absorb HF and become a hazard for an indefinite time. Such spills should be cleaned and neutralized immediately. Do not flush to sewers or waterways! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Do not breathe mist or vapor. Use with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Do not get in eyes, on skin, or on clothing. Always wear impervious gloves, chemical safety goggles and protective clothing when handling this material. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Keep containers closed when not in use. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid). Do not reuse containers. Follow all SDS precautions in handling empty containers.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Store in a cool, well-ventilated area away from all incompatible materials. Keep container tightly closed. Store in corrosion proof area. Keep out of the reach of children. Storage facilities should be constructed for containment and neutralization of spills. Handling and storage of HF requires special materials and technology for containers, pipes, valves, etc., which is available from suppliers.

SECTION 8: Exposure controls/personal protection

8.1 Occupational exposure limits

Chemical Name	Exposure Limits
Water	None Established
Hydrogen Fluoride	0.5 ppm TWA, 2 ppm Ceiling ACGIH TLV (skin) 3 ppm TWA OSHA PEL

8.2 Exposure controls

Appropriate engineering controls

A system of local and / or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Personal protective equipment

Eye/face protection

Face shield with chemical safety goggles required to prevent eye and face contact. Maintain eye wash fountain and quick-drench facilities in work area.

Skin and body protection

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection

If the exposure limit is exceeded, a full face piece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full face piece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in Oxygen-deficient atmospheres. Since the IDLH is low (30 ppm,) the above cartridge system is not specifically approved for HF (reference - 3M Respirator Selection Guide.)

Control of environmental exposure

No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Colorless, fuming liquid
Odor	Acrid odor - do not breathe fumes
Odor Thresh	Not available
pH	1.0 (0.1M solution)
Melting Point/Range	< -36°C (< -33°F)
Boiling Point/Range	108°C (226°F)
Evaporation Rate	Not determined.
Flammability (gas, solid)	Not applicable.
Flammability or explosive limit	
Upper	: Not applicable
Lower	: Not applicable
Vapor Pressure	25 @ 20°C (68°F)
Vapor Density	1.97
Density	1.153 g/cc for 49 - 50% Hydrofluoric Acid solution
Solubility	Infiniteley soluble

Partition coefficient; n-octanol/water	No data available.
Autoignition Temp	No data available.
Decomposition Temp	No data available.
Viscosity	1.4 cPs
Molecular Formula	HF
Molecular Weight	20.01
VOC Content(%)	No data available.
Oxidizing properties	No data available.

9.2 Other safety information

Conductivity - 0,01 µS/cm at 20 °C
Surface tension - 23,2 mN/m at 20,0 °C

SECTION 10: Stability and reactivity

10.1 Reactivity

Not available.

10.2 Chemical stability

Stable at room temperature (68°F) when stored and used under proper conditions.

10.3 Possibility of hazardous reactions

Reacts with most common metals to form flammable, explosive hydrogen gas. Reacts with bases generating heat.

10.4 Conditions to avoid

Avoid excessive heat and elevated temperatures.

10.5 Incompatible materials

Bases, metals, reducing agents, oxidizing agents, carbides, acetic acid, combustible materials, carbonates, organic materials, rubber, leather, and oxides of silica. Hydrofluoric acid is very reactive and is incompatible with most other materials. Will also react with steam or water to produce toxic fumes. Attacks glass and other silicon containing compounds. Reacts with silica to produce Silicon Tetrafluoride, a hazardous colorless gas.

10.6 Hazardous decomposition products

On contact with metals, liberates hydrogen gas. Thermal decomposition may release oxides of fluorine, hydrogen fluoride, and hydrogen.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Product Information, Component Information

Exposure to hydrofluoric acid can produce harmful health effects that may not be immediately apparent. If inhaled or swallowed, this compound can cause fluoride poisoning. Early symptoms include nausea, vomiting, diarrhea, and weakness.

Acute toxicity

Hydrofluoric Acid: Oral rat LD50 – >25 mg/kg; Inhalation rat LC50 – 1276 ppm/1 hr; Skin LD50 – 5 mg/kg (Point estimate)

Skin corrosion/irritation

Causes severe burns and readily penetrates the skin causing deep tissue layer destruction. Severity and rapidity of onset of signs and symptoms depends on the concentration, duration of exposure and penetrability of the exposed tissues. Swelling, redness and pain may be delayed up to 8 hours after exposure. Burns from hydrogen fluoride are often not reported until the damage is extensive. The destruction of tissue proceeds under the toughened, coagulated skin so that ulcers extend deeply, heal slowly and result in scarring. Prompt treatment of any contact is necessary. Systemic poisoning can result from extensive skin burns with symptoms as described under ingestion.

Serious eye damage/eye irritation

Causes severe burns with permanent damage and blindness possible. Signs and symptoms may be delayed for up to several hours.

Respiratory or skin sensitization

Respiratory sensitization and/or skin sensitization	Inhalation of mists or vapors may cause severe irritation and burns of the nose, throat and upper respiratory tract. Higher concentrations can cause burns, pulmonary edema and death. Shortness of breath, irregular pulse, bloody urine, pulmonary edema, lung inflammation, airway obstruction and systemic poisoning with effects described under ingestion may occur. Severe overexposure may be fatal. Skin sensitization noted above.

Aggravation of pre-existing conditions

Persons with pre-existing skin disorders, eye problems, or impaired kidney or respiratory function may be more susceptible to the effects of this substance.

Germ cell mutagenicity

Not expected to cause mutagenic activity.

Carcinogenicity

None of the components of this product are listed as a carcinogen or suspected carcinogen by OSHA, IARC, and NTP.

Reproductive toxicity

Reproductive harm is not expected from this product.

Specific target organ toxicity - single exposure

No data available.

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Chronic effects

Repeated or prolonged overexposure to hydrogen fluoride may result in digestive disturbances and an increase in bone density (fluorosis). Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream.

11.2 Additional Information

None.

SECTION 12: Ecological information

12.1 Toxicity

No data available. This product may be hazardous for the environment due to its low pH. Releases to the environment should be avoided.

12.2 Persistence and degradability

Hydrofluoric acid is an inorganic compound and not subject to biodegradation.

12.3 Bio accumulative potential

No further relevant information available.

12.4 Mobility in soil

No further relevant information available.

12.5 Results of PBT and vPvB assessment

No data available.

12.6 Endocrine disrupting properties

No data available.

SECTION 13: Disposal considerations

13.1 Waste Disposal Methods

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

SECTION 14: Transportation information

	UN Number	Proper shipping name	Hazard Class	Packing Group	Environmental Hazard
US DOT	UN1790	Hydrofluoric acid (with not more than 60% strength)*	8 (6.1)	II	Not applicable
IMDG	UN1790	Hydrofluoric acid (with not more than 60% strength)	8 (6.1)	II	Not applicable
IATA	UN1790	Hydrofluoric acid (with not more than 60% strength)	8 (6.1)	II	Not applicable

*** Hazardous Substance (49CFR172.101):** Hydrofluoric acid (RQ 100 lbs)- (166 lbs. product)

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

Special Precautions for User: Not applicable

SECTION 15: Regulatory information

US federal regulations:

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

This product has a Reportable Quantity (RQ) of 166 lbs. (based on the RQ for Hydrofluoric acid of 100 lbs present at ≤60%). Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories:
SARA 311/312
Refer to Section 2 for OSHA Hazard Classification.

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:
Hydrogen Fluoride 7664-39-3 ≤60%

SARA 302 Extremely hazardous substance
Hydrogen Fluoride (100 lbs)

Other federal regulations:

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
Hydrofluoric acid (CAS 7664-39-3)
Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Hydrofluoric acid (CAS 7664-39-3)
Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)
Hazardous substance
Safe Drinking Water Act (SDWA)
4.0 mg/l
Food and Drug Administration (FDA)
Not regulated.

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.
US. Massachusetts RTK - Substance List
Hydrofluoric acid (CAS 7664-39-3)
US. New Jersey Worker and Community Right-to-Know Act
Hydrofluoric acid (CAS 7664-39-3) 100 lbs
US. Pennsylvania RTK - Hazardous Substances
Hydrofluoric acid (CAS 7664-39-3)
US. Rhode Island RTK - Hydrofluoric acid (CAS 7664-39-3)

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Not listed

International Inventories:

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes

Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

* A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

SECTION 16: Other information

Issue Date 11/25/2019
Revision Date 3/25/2024

Disclaimer:
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.