Mallinckrodt Baker

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**HYDROFLUORIC ACID**
Version #	03
Revision date	01-06-2010
CAS #	Mixture
Product Codes	J.T.Baker: 20659, 5368, 5659, 5818, 5823, 5824, 5840, 5865, 5900, 5901, 6904, 9559, 9560, 9563, 9564, 9567, 9570, 9572, 9573, 9574, 9785 Mallinckrodt: 2640, 2648, V141, V580
Synonym(s)	FLUOROHYDRIC ACID * FLUORIC ACID * HYDROGEN FLUORIDE SOLUTION
Manufacturer	Mallinckrodt Baker, Inc.
Address	222 Red School Lane Phillipsburg, NJ 08865 US
Customer Service	800-582-2537
24 Hour Emergency	908-859-2151
Chemtrec	800-244-4444

2. Hazards Identification

Emergency overview	DANGER Extremely hazardous liquid and vapor. May be fatal if swallowed. May be fatal if absorbed through skin. May be fatal if inhaled. Corrosive. Causes skin and eye burns. Prolonged exposure may cause chronic effects. Contact with metals may evolve flammable hydrogen gas.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Corrosive to the eyes and may cause severe damage including blindness. Causes eye burns. Very toxic in contact with eyes. Risk of serious damage to eyes. Do not get this material in contact with eyes.
Skin	Corrosive. Very toxic in contact with skin. Causes severe skin burns. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone. Do not get this material in contact with skin.
Inhalation	Corrosive. Causes burns. Very toxic by inhalation. Prolonged inhalation may be harmful. Sore throat. Coughing. Difficulty in breathing. Do not breathe dust/fume/gas/mist/vapors/spray.
Ingestion	Corrosive. Very toxic if swallowed. Components of the product may be absorbed into the body by ingestion. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Do not ingest.
Target organs	Bone. Eyes. RESPIRATORY SYSTEM. Skin.
Chronic effects	Intake of more than 6 mg of fluorine per day may result in fluorosis, bone and joint damage. Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream.
Signs and symptoms	Contact with this material will cause burns to the skin, eyes and mucous membranes. Symptoms are prostration, gasping, pallor, and uncoordinated movements. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Symptoms may include redness, edema, drying, defatting and cracking of the skin. Irritation of nose and throat. Irritation of eyes and mucous membranes.
Potential environmental effects	Components of this product are hazardous to aquatic life. May cause long-term adverse effects in the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
HYDROGEN FLUORIDE	7664-39-3	40 - 60
Other components below reportable levels		40 - 60

4. First Aid Measures

First aid procedures

Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact
Immediately remove contaminated clothing under a shower and flush exposed areas with large quantities of water for five minutes. Wash carefully behind ears, under nails and in skin folds. Get immediate medical assistance. For those providing assistance, avoid further skin contact to yourself and others. Wear HF impervious clothing with face shield or goggles and HF impervious gloves. If available, apply calcium gluconate gel (2.5%) into burn area continuously for 15 minutes. If calcium gluconate gel is not available, continue to wash exposed areas with water until patient is seen by a physician and is taken to a hospital. Insure that contaminated clothing and shoes are properly bagged and discarded. Insure that jewelry is removed and soaked in calcium gluconate solution to decontaminate.

Inhalation
Move to fresh air. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting without advice from poison control center. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Rinse mouth thoroughly. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Notes to physician
In case of shortness of breath, give oxygen. Keep victim warm.

General advice
Immediate medical attention is required. In case of shortness of breath, give oxygen. Keep victim warm. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Calcium gluconate gel 2.5% should be available in close proximity to the work place.

5. Fire Fighting Measures

Flammable properties
The product is not flammable. Not flammable, but reacts with most metals to form flammable hydrogen gas.

Extinguishing media

Suitable extinguishing media
Water.

Protection of firefighters

Protective equipment and precautions for firefighters
In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Specific methods
In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

6. Accidental Release Measures

Personal precautions
Ventilate the area. Remove sources of ignition. Keep unnecessary personnel away. Local authorities should be advised if significant spillages cannot be contained. Keep out of low areas. Keep people away from and upwind of spill/leak. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Avoid skin contact and inhalation of vapors during disposal of spills.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up Should not be released into the environment.

Large Spills: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece).

Never return spills in original containers for re-use. Following product recovery, flush area with water. Clean surface thoroughly to remove residual contamination. Porous materials (concrete, wood, plastic, etc.) will absorb HF and become a hazard for an indefinite time.

J. T. Baker Hydrofluoric Acid Emergency Cleanup Kit is recommended for spills of this product.

7. Handling and Storage

Handling Do not breathe dust/fume/gas/mist/vapors/spray. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not get this material on clothing. Do not use in areas without adequate ventilation. Wear personal protective equipment. Avoid prolonged exposure. Wash thoroughly after handling. Handle and open container with care. Considerable heat is generated when water or acid is added, therefore when making solutions always add the caustic to the water or acid with constant stirring.

Storage Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep out of the reach of children. Use care in handling/storage. Keep away from food, drink and animal feedingstuffs. Do not store in metal containers.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	Type	Value
HYDROGEN FLUORIDE (7664-39-3)	Ceiling	2.0000 ppm
	TWA	0.5000 ppm
		2.5000 mg/m3

U.S. - OSHA

Components	Type	Value
HYDROGEN FLUORIDE (7664-39-3)	PEL	2.5000 mg/m3
	STEL	6.0000 ppm
	TWA	2.5000 mg/m3
		3.0000 ppm

Engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Eye / face protection Do not get in eyes. Chemical goggles are recommended. Face-shield. Provide eyewash station and safety shower.

Skin protection Do not get this material in contact with skin. Do not get this material on clothing. Wear chemical protective equipment that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighters protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations. Use chemical splash goggles and face shield (ANSI Z87.1 or approved equivalent). Chemical resistant gloves.

Respiratory protection	Do not breathe dust/fume/gas/mist/vapors/spray. Wear positive pressure self-contained breathing apparatus (SCBA). Chemical respirator with acid gas cartridge.
General hygeine considerations	Do not get in eyes. Do not get this material in contact with skin. Do not get this material on clothing. When using, do not eat, drink or smoke. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance	Fuming liquid.
Color	Colorless.
Odor	Strong. Irritating.
Odor threshold	Not available.
Physical state	Liquid.
Form	Liquid.
pH	1 (0.1M solution)
Melting point	-43.6 °F (-41.68 °C) estimated
Freezing point	-43.6 °F (-41.68 °C) estimated
Boiling point	140 °F (60 °C) estimated
Flash point	Not available.
Evaporation rate	Not available.
Flammability	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Vapor pressure	611 hPa estimated
Vapor density	1.97
Specific gravity	0.9909 estimated
Relative density	Not available.
Solubility (water)	Miscible.
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Percent volatile	50 % estimated
Molecular weight	20.01
Molecular formula	HF in Aqueous Solution.

10. Chemical Stability & Reactivity Information

Chemical stability	Stable at normal conditions. Contact with certain metals liberates flammable gas.
Conditions to avoid	Reacts violently with strong alkaline substances. This product may react with reducing agents. Do not mix with other chemicals.
Incompatible materials	Incompatible with bases. This product may react with reducing agents. May be corrosive to metals.
Hazardous decomposition products	Hydrogen fluoride.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	Test Results
HYDROFLUORIC ACID (Mixture)	Acute Inhalation LC50 Mouse: 1000 mg/l estimated
Components	**Test Results**
HYDROGEN FLUORIDE (7664-39-3)	Acute Inhalation LC50 Mouse: 500 mg/l 1.00 Hours
	Acute Inhalation LC50 Rat: 1278 mg/l 1.00 Hours

* Estimates for product may be based on additional component data not shown.

Sensitization

US ACGIH Threshold Limit Values: Skin designation

HYDROGEN FLUORIDE (CAS 7664-39-3) Can be absorbed through the skin.

Acute effects Causes burns.

Local effects Very toxic by inhalation, in contact with skin and if swallowed.

Chronic effects Hazardous by OSHA criteria. Prolonged exposure may cause chronic effects.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

HYDROGEN FLUORIDE (CAS 7664-39-3) A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

HYDROGEN FLUORIDE (CAS 7664-39-3) 3 Not classifiable as to carcinogenicity to humans.

Skin corrosion/irritation Hazardous by OSHA criteria.

Epidemiology Not available.

Neurological effects Not available.

12. Ecological Information

Ecotoxicity Components of this product are hazardous to aquatic life. Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.

Environmental effects Harmful to aquatic organisms.

Persistence and degradability Not available.

13. Disposal Considerations

Waste codes D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]

US RCRA Hazardous Waste U List: Reference

HYDROGEN FLUORIDE (CAS 7664-39-3) U134

Disposal instructions Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Dispose in accordance with all applicable regulations.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN1790
Proper shipping name Hydrofluoric acid (with not more than 60% strength) (RQ = 200 LBS)
Hazard class 8
Subsidiary hazard class 6.1
Packing group II
Additional information:
Special provisions A6, A7, B15, IB2, N5, N34, T8, TP2, TP12
Packaging exceptions 154

Packaging non bulk	202
Packaging bulk	243
ERG number	157

IATA

Basic shipping requirements:

UN number	1790
Proper shipping name	Hydrofluoric acid 60% or less strength
Hazard class	8
Subsidiary hazard class	6.1
Packing group	II

IMDG

Basic shipping requirements:

UN number	1790
Proper shipping name	HYDROFLUORIC ACID solution, with not more than 60% hydrogen flouride
Hazard class	8
Subsidiary hazard class	6.1
Packing group	II

DOT

IATA

IMDG

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

HYDROGEN FLUORIDE (CAS 7664-39-3) 100 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

HYDROGEN FLUORIDE (CAS 7664-39-3) 100 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

HYDROGEN FLUORIDE (CAS 7664-39-3) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

HYDROGEN FLUORIDE (CAS 7664-39-3) Listed.

CERCLA (Superfund) reportable quantity

HYDROGEN FLUORIDE: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - Yes
Section 311 hazardous chemical	Yes

Inventory status

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
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
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 that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

HYDROGEN FLUORIDE (CAS 7664-39-3)	100 LBS
	500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance

HYDROGEN FLUORIDE (CAS 7664-39-3)	Listed.

Saf-T-Data

Health: 4 - Extreme (Poison)
Flammability: 0 - None
Reactivity: 2 - Moderate
Contact: 4 - Extreme (Corrosive)
Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: W - White (Corrosive)

16. Labeling Info

Label Hazard Warning DANGER

Extremely hazardous liquid and vapor. Corrosive. Causes skin and eye burns. May be fatal if inhaled, absorbed through skin, or swallowed. Prolonged exposure may cause chronic effects. Contact with metals may evolve flammable hydrogen gas.

Label Precautions Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Label First Aid	Immediately flush eyes with plenty of water for at least 15 minutes. Continue rinsing. Get medical attention immediately. Immediately remove contaminated clothing under a shower and flush exposed areas with large quantities of water for five minutes. Wash carefully behind ears, under nails and in skin folds. Get immediate medical assistance. For those providing assistance, avoid further skin contact to yourself and others. Wear HF impervious clothing with face shield or goggles and HF impervious gloves. If available, apply calcium gluconate gel (2.5%) into burn area continuously for 15 minutes. If calcium gluconate gel is not available, continue to wash exposed areas with water until patient is seen by a physician and is taken to a hospital. Insure that contaminated clothing and shoes are properly bagged and discarded. Insure that jewelry is removed and soaked in calcium gluconate solution to decontaminate. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Rinse mouth thoroughly. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

17. Other Information

NFPA ratings	Health: 4 Flammability: 0 Instability: 1
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