

SAFETY DATA SHEET

According to US Regulation 29 CFR 1910.1200 (HazCom 2012)

1. Identification

Product identifier: Hydrofluoric Acid

Other means of identification

Product No.: 2640, 2648, 5824, 5865, 5900, 5901, 6904, 9387, 9560, 9563, 9564, 9567, 9570, 9573, 9574, 9576, 9578, 9585, V142, V179, 37815, 72184, 72185

Recommended restrictions

Recommended use: For Laboratory, Research or Manufacturing Use.

Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Company Name: Avantor Performance Materials, LLC
Address: 100 Matsonford Rd, Suite 200
Radnor, PA 19087

Telephone: Customer Service: 855-282-6867

Contact Person: Product Information Compliance
E-mail: info@avantormaterials.com

Emergency telephone number:

CHEMTREC: 1-800-424-9300 within US and Canada

2. Hazard(s) identification

Hazard Classification

Physical Hazards

Corrosive to metal Category 1

Health Hazards

Acute toxicity (Oral) Category 2
Acute toxicity (Dermal) Category 1
Acute toxicity (Inhalation - vapor) Category 2
Skin Corrosion/Irritation Category 1
Serious Eye Damage/Eye Irritation Category 1
Specific Target Organ Toxicity - Single Exposure Category 1¹
Specific Target Organ Toxicity - Repeated Exposure Category 1²

Target Organs

1. Blood, Cardiovascular system, Respiratory system
2. Bone, Endocrine system, Teeth

Unknown toxicity - Health

Acute toxicity, oral 47 %
Acute toxicity, dermal 47 %

Acute toxicity, inhalation, vapor 47 %

Label Elements

Hazard Symbol:



Signal Word:

Danger

Hazard Statement:

May be corrosive to metals.
Fatal if swallowed.
Fatal in contact with skin.
Fatal if inhaled.
Causes severe skin burns and eye damage.
Causes damage to organs.
Causes damage to organs through prolonged or repeated exposure.

Precautionary Statements

Prevention:

Keep only in original packaging. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection. [In case of inadequate ventilation] wear respiratory protection.

Response:

IF exposed: Call a POISON CENTER or doctor/physician. IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. Wash contaminated clothing before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. Absorb spillage to prevent material damage.

Storage:

Store in a corrosion-resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal:

Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC):

None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	CAS number	Content in percent (%)*
Hydrogen fluoride	7664-39-3	45 - 55%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information:	Immediate medical attention is required. If breathing is difficult, give oxygen. Keep victim warm. Ensure that emergency personnel are aware of the material involved, and take precautions to protect themselves.
Ingestion:	Call a physician or poison control center immediately. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Inhalation:	Move to fresh air. Call a physician or poison control center immediately. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration.
Skin Contact:	Immediately remove contaminated clothing under a shower. Flush exposed areas with large quantities of water for five minutes. Wash carefully behind ears, under nails and in skin folds. Get medical attention immediately. 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 or until pain relief. For a larger area, use iced Benzalkonium Chloride 0.13% soaks until pain has resolved at least 30-40 minutes. If calcium gluconate gel or Benzalkonium Chloride 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.
Eye contact:	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

Most important symptoms/effects, acute and delayed

Symptoms:	Symptoms may be delayed.
Hazards:	None known.

Indication of immediate medical attention and special treatment needed

Treatment:	Injection of 5% calcium gluconate is indicated as the primary medical treatment for large burns. If benzalkonium chloride soaks or calcium gluconate gel do not provide significant relief of pain within 30 to 40 minutes, injection of calcium gluconate solution is indicated. For burns of large skin areas (>15%), for ingestion and for significant inhalation exposure, severe systemic effects may occur. Monitor and correct for hypocalcemia, cardiac arrhythmias, hypomagnesemia and hyperkalemia. Calcium supplements are essential for emergency response to large exposures.
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5. Fire-fighting measures

General Fire Hazards: In case of fire and/or explosion do not breathe fumes. Product is highly acidic. Wear protective gear if spilled during fire fighting.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Foam, carbon dioxide or dry powder.

Unsuitable extinguishing media: The product reacts with water and will generate heat.

Specific hazards arising from the chemical: Product is acidic. Wear appropriate protective gear if spilled during firefighting. Reacts with most metals to form flammable hydrogen gas. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out. In case of fire and/or explosion do not breathe fumes.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment. Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and material for containment and cleaning up: Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Avoid inhalation of vapors and spray mists. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. Never add water to acid! Always add acid to water while stirring to prevent release of heat, steam and fumes.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Keep in a cool, well-ventilated place. Store in a dry place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
Hydrogen fluoride - as F	TWA	0.5 ppm	US. ACGIH Threshold Limit Values (2011)
	Ceiling	2 ppm	US. ACGIH Threshold Limit Values (2011)
	SKIN_DES	Can be absorbed through the skin.	US. ACGIH Threshold Limit Values (2011)
Hydrogen fluoride	REL	3 ppm 2.5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	Ceil_Time	6 ppm 5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
Hydrogen fluoride - as F	PEL	2.5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	3 ppm	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	STEL	6 ppm	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
Hydrogen fluoride	TWA	3 ppm	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)
Hydrogen fluoride - as F	STEL	6 ppm	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	TWA	3 ppm	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
Hydrogen fluoride	AN ESL	Animal 0.75 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	ST ESL	Vegetation 3 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	AN ESL	Health 8.7 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	AN ESL	Vegetation 0.6 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	ST ESL	Health 22 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	ST ESL	Vegetation 3.7 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	AN ESL	Vegetation 0.73 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	AN ESL	Animal 0.92 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	AN ESL	Health 11 ppb	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
	ST ESL	Health 18 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (11 2016)
Hydrogen fluoride - as F	STEL	1 ppm 0.83 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	TWA PEL	0.4 ppm 0.33 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)
	SKIN_DES	Can be absorbed through the skin.	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (02 2012)

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
Hydrogen fluoride (Fluoride: Sampling time: Prior to shift.)	2 mg/l (Urine)	ACGIH BEI (03 2013)
Hydrogen fluoride (Fluoride: Sampling time: End of shift.)	3 mg/l (Urine)	ACGIH BEI (03 2013)

Appropriate Engineering Controls No data available.

Individual protection measures, such as personal protective equipment

General information:	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. An eye wash and safety shower must be available in the immediate work area.
Eye/face protection:	Wear safety glasses with side shields (or goggles) and a face shield.
Skin Protection	
Hand Protection:	Chemical resistant gloves
Other:	Wear suitable protective clothing.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator. Chemical respirator with specific cartridge and full facepiece providing protection against the compound of concern.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Avoid contact with eyes, skin, and clothing.

9. Physical and chemical properties

Appearance

Physical state:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	Strong., Irritating.
Odor threshold:	No data available.
pH:	1 (0.1 molar aqueous solution)
Melting point/freezing point:	-36 °C
Initial boiling point and boiling range:	108 °C
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.

Vapor pressure:	3.33 kPa
Vapor density:	No data available.
Density:	1.18 g/ml (20 °C)
Relative density:	1.18 (20 °C)
Solubility(ies)	
Solubility in water:	Miscible
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

Other information

Molecular weight:	20.01 g/mol
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10. Stability and reactivity

Reactivity:	Reacts violently with strong alkaline substances.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Heat, sparks, flames. Contact with incompatible materials.
Incompatible Materials:	Strong oxidizing agents. Acids. Strong bases. Ammonia. Organic compounds. Glass. Cyanides. Fluorine. Metals. May attack some plastics, rubber and coatings.
Hazardous Decomposition Products:	Hydrogen fluoride.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	Fatal if inhaled.
Skin Contact:	Fatal in contact with skin. Causes severe skin burns.
Eye contact:	Causes serious eye damage.
Ingestion:	Fatal if swallowed. May cause burns of the gastrointestinal tract if swallowed.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral Product:	No data available.
Dermal Product:	No data available.
Inhalation Product:	No data available.

Repeated dose toxicity

Product: No data available.

Skin Corrosion/Irritation

Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation

Product: Causes serious eye damage.

Respiratory or Skin Sensitization

Product: Not a skin sensitizer.

Carcinogenicity

Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

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

No carcinogenic components identified

Germ Cell Mutagenicity
In vitro

Product: No mutagenic components identified

In vivo

Product: No mutagenic components identified

Reproductive toxicity

Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure

Product: Blood. Cardiovascular system Respiratory system

Specific Target Organ Toxicity - Repeated Exposure

Product: Bones Endocrine system Teeth.

Target Organs

Specific Target Organ Toxicity - Single Exposure: Blood, Cardiovascular system, Respiratory system

Specific Target Organ Toxicity - Repeated Exposure: Bone, Endocrine system, Teeth

Aspiration Hazard

Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:
Acute hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Chronic hazards to the aquatic environment:
Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Toxicity to Aquatic Plants

Product: No data available.

Persistence and Degradability
Biodegradation

Product: Expected to be readily biodegradable.

BOD/COD Ratio

Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)

Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)

Product: No data available.

Mobility in soil:

The product is water soluble and may spread in water systems.

Other adverse effects:

The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions:

Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging:

Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number:	UN 1790
UN Proper Shipping Name:	Hydrofluoric acid
Transport Hazard Class(es)	
Class:	8
Label(s):	8, 6.1
Packing Group:	II
Marine Pollutant:	No

Special precautions for user: Keep away from alkalis.

IMDG

UN Number:	UN 1790
UN Proper Shipping Name:	HYDROFLUORIC ACID (WITH NOT MORE THAN 60% ACID)
Transport Hazard Class(es)	
Class:	8
Label(s):	8, 6.1
EmS No.:	F-A, S-B
Packing Group:	II
Marine Pollutant:	No
Special precautions for user:	Keep away from alkalis.

IATA

UN Number:	UN 1790
Proper Shipping Name:	Hydrofluoric acid
Transport Hazard Class(es):	
Class:	8
Label(s):	8, 6.1
Packing Group:	II
Marine Pollutant:	No
Special precautions for user:	Keep away from alkalis.

15. Regulatory information

US Federal Regulations

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

None present or none present in regulated quantities.

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

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

<u>Chemical Identity</u>	<u>Reportable quantity</u>
Hydrogen fluoride	100 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Corrosive to metal
Acute toxicity (any route of exposure)
Skin Corrosion or Irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 302 Extremely Hazardous Substance

<u>Chemical Identity</u>	<u>Reportable quantity</u>	<u>Threshold Planning Quantity</u>
Hydrogen fluoride	100 lbs.	100 lbs.

SARA 304 Emergency Release Notification

<u>Chemical Identity</u>	<u>Reportable quantity</u>
Hydrogen fluoride	100 lbs.

SARA 311/312 Hazardous Chemical

<u>Chemical Identity</u>	<u>Threshold Planning Quantity</u>
Hydrogen fluoride	100 lbs.

SARA 313 (TRI Reporting)

<u>Chemical Identity</u>	<u>Reporting threshold for other users</u>	<u>Reporting threshold for manufacturing and processing</u>
Hydrogen fluoride	10000 lbs.	25000 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

<u>Chemical Identity</u>	<u>Reportable quantity</u>
Hydrogen fluoride	1000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3):

<u>Chemical Identity</u>	<u>Reportable quantity</u>
Hydrogen fluoride	Reportable quantity: 100 lbs.

US State Regulations

US. California Proposition 65

No ingredient requiring a warning under CA Prop 65.

US. New Jersey Worker and Community Right-to-Know Act

<u>Chemical Identity</u>
Hydrogen fluoride

US. Massachusetts RTK - Substance List

<u>Chemical Identity</u>
Hydrogen fluoride

US. Pennsylvania RTK - Hazardous Substances

<u>Chemical Identity</u>
Hydrogen fluoride

US. Rhode Island RTK

<u>Chemical Identity</u>
Hydrogen fluoride

International regulations

Montreal protocol

Not applicable

Stockholm convention

Not applicable

Rotterdam convention

Not applicable

Kyoto protocol

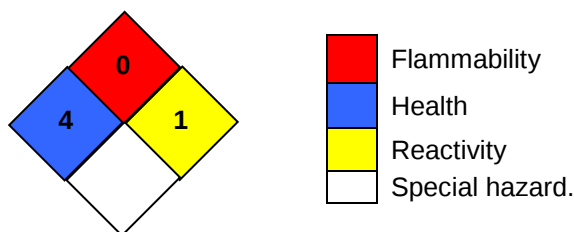
Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Mexico INSQ:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory

16. Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date: 07-08-2019

Revision Information: Not relevant.

Version #: 1.6

Source of information: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, information from the Toxicology Data Network (TOXNET), European Chemical Agency (ECHA) substance dossiers, IARC Monographs, US National Toxicology Program data, the Agency for Toxic Substances and Disease Registry, other manufacturer's SDSs and other sources, as appropriate.

Further Information: No data available.

Disclaimer:

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