

Material Safety Data Sheet



Hydrogen Fluoride

Section 1. Chemical product and company identification

Product Name : Hydrogen Fluoride
Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Product use : Synthetic/Analytical chemistry.
Synonym : anhydrous hydrofluoric acid; hf-a; hydrofluoric acid
MSDS# : 001077
Date of Preparation/Revision : **11/5/2007.**
In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. (COLORLESS GAS WITH AN IRRITATING ODOR)
Emergency overview : Danger!
CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTENTS UNDER PRESSURE.
HARMFUL IF INHALED.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, RESPIRATORY TRACT, SKIN, EYES, BONES, EYE, LENS OR CORNEA.
Do not get in eyes, on skin or clothing. Do not breathe gas. Do not puncture or incinerate container. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.
Contact with rapidly expanding gases can cause frostbite.
Routes of entry : Inhalation,Dermal,Eyes
Potential acute health effects
Eyes : Severely corrosive to the eyes.
Skin : Severely corrosive to the skin.
Inhalation : Toxic by inhalation. Severely corrosive to the respiratory system.
Ingestion : Ingestion is not a normal route of exposure for gases
Potential chronic health effects : **CARCINOGENIC EFFECTS** Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS: Not available.
Medical conditions aggravated by overexposure : Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
See toxicological Information (section 11)

Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Hydrogen Fluoride	7664-39-3	100	ACGIH TLV (United States, 1/2006). Skin Notes: as F Substances for which there is a Biological Exposure Index or Indices ACGIH 2005 Adoption CEIL: 2 ppm TWA: 0.5 ppm 65534 times per shift, 8 hour (s). NIOSH REL (United States, 12/2001). Notes: as F CEIL: 5 mg/m ³ 65534 times per shift, 15

minute(s).

CEIL: 6 ppm 65534 times per shift, 15 minute(s).

TWA: 2.5 mg/m³ 65534 times per shift, 10 hour(s).

TWA: 3 ppm 65534 times per shift, 10 hour(s).

OSHA PEL (United States, 11/2006). Notes: as F

TWA: 2.5 mg/m³ 65534 times per shift, 8 hour(s).

OSHA PEL Z2 (United States, 11/2006).

TWA: 3 ppm 65534 times per shift, 8 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If fumes are still suspected to be present, the rescuer should wear an appropriate mask or a self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Fire fighting media and instructions : Use an extinguishing agent suitable for surrounding fires.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

No specific hazard.

Special protective equipment for fire-fighters : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 7. Handling and storage

Handling : Do not get in eyes, on skin or on clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. Use equipment rated for cylinder pressure. Close valve after each use and when empty.

Hydrogen Fluoride

- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).
CAUTION: There is a potential over-pressure hazard with long term storage of carbon steel containers and Hydrogen Fluoride. Hydrogen Fluoride in the carbon steel container reacts very slowly with the iron in the steel to form iron fluoride and hydrogen which builds pressure within the container. Hydrogen Fluoride in carbon steel containers should not be stored for extended periods of time (recommend less than two years).
Extreme caution should be taken during the handling of any carbon steel containers storing Hydrogen Fluoride that have been stored for extended periods of time.

Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, vapor or mist, use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Personal protection in case of a large spill** : Full chemical resistant suit and self-contained breathing apparatus only by trained and authorized persons.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

- Molecular weight** : 20.01 g/mole
- Molecular formula** : F-H
- Boiling/condensation point** : 18.65°C (65.6°F)
- Melting/freezing point** : -83.6°C (-118.5°F)
- Critical temperature** : 188°C (370.4°F)
- Vapor pressure** : 0.5 psig
- Vapor density** : 0.7 (Air = 1)
- Specific Volume (ft³/lb)** : 5.03778
- Gas Density (lb/ft³)** : 0.1985

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with alkalis.
Reactive with metals.
- Hazardous decomposition products** : These products are halogenated compounds, hydrogen fluoride.

Section 11. Toxicological information

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Hydrogen Fluoride	LDLo	500 mg/kg	Dermal	Mouse
	LC50	1276 ppm (1 hour(s))	Inhalation	Rat
	LC50	342 ppm (1 hour (s))	Inhalation	Mouse

- IDLH** : 30 ppm
- Chronic effects on humans** : Causes damage to the following organs: lungs, upper respiratory tract, skin, eyes, bones, eye, lens or cornea.
- Other toxic effects on humans** : Extremely hazardous in case of skin contact (corrosive), of eye contact (corrosive), of inhalation (lung corrosive).
- Specific effects**
- Carcinogenic effects** : No known significant effects or critical hazards.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.



Section 12. Ecological information

- Products of degradation** : These products are halogenated compounds.
- Toxicity of the products of biodegradation** : The products of degradation are less toxic than the product itself.
- Environmental fate** : Not available.
- Environmental hazards** : No known significant effects or critical hazards.
- Toxicity to the environment** : Not available.





Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

<u>Regulatory information</u>	<u>UN number</u>	<u>Proper shipping name</u>	<u>Class</u>	<u>Packing group</u>	<u>Label</u>	<u>Additional information</u>
DOT Classification	UN1052	HYDROGEN FLUORIDE, ANHYDROUS	8	Not applicable (gas).	 	<p>Reportable quantity 100 lbs. (45.36 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger</p>

Hydrogen Fluoride

						<p>Aircraft Quantity limitation: Forbidden.</p> <p>Cargo Aircraft Quantity limitation: Forbidden.</p> <p>Special provisions 3, B7, B46, B71, B77, T10, TP2, T6</p>
TDG Classification	UN1052	HYDROGEN FLUORIDE, ANHYDROUS	8	Not applicable (gas).	 	<p>Explosive Limit and Limited Quantity Index 0</p> <p>ERAP Index 1000</p> <p>Passenger Carrying Ship Index Forbidden</p> <p>Passenger Carrying Road or Rail Index Forbidden</p>
Mexico Classification	UN1052	HYDROGEN FLUORIDE, ANHYDROUS	8	Not applicable (gas).	 	-

Section 15. Regulatory information

United States

- U.S. Federal regulations** : TSCA 8(b) inventory: hydrogen fluoride
TSCA precursor chemical list: hydrogen fluoride
SARA 302/304/311/312 extremely hazardous substances: hydrogen fluoride
SARA 302/304 emergency planning and notification: hydrogen fluoride
SARA 302/304/311/312 hazardous chemicals: hydrogen fluoride
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: hydrogen fluoride: Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: hydrogen fluoride
Clean air act (CAA) 112 accidental release prevention: hydrogen fluoride
Clean air act (CAA) 112 regulated flammable substances: No products were found.
Clean air act (CAA) 112 regulated toxic substances: hydrogen fluoride

SARA 313

Hydrogen Fluoride

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Hydrogen Fluoride	7664-39-3	100
Supplier notification	: Hydrogen Fluoride	7664-39-3	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : Pennsylvania RTK: hydrogen fluoride: (environmental hazard, generic environmental hazard)
Massachusetts RTK: hydrogen fluoride
New Jersey: hydrogen fluoride

Canada
WHMIS (Canada) : Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
Class D-2A: Material causing other toxic effects (VERY TOXIC).
Class E: Corrosive gas.
CEPA DSL: hydrogen fluoride

Section 16. Other information

United States

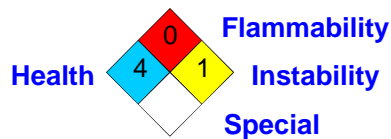
Label Requirements : CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTENTS UNDER PRESSURE.
HARMFUL IF INHALED.
CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, RESPIRATORY TRACT, SKIN, EYES, BONES, EYE, LENS OR CORNEA.

Canada
Label Requirements : Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
Class D-2A: Material causing other toxic effects (VERY TOXIC).
Class E: Corrosive gas.

Hazardous Material Information System (U.S.A.) :

Health	*	4
Fire hazard		0
Reactivity		1
Personal protection		X

National Fire Protection Association (U.S.A.) :



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.