

# Material Safety Data Sheet



Hydrogen Fluoride

## Section 1. Chemical product and company identification

<b>Product name</b>	: Hydrogen Fluoride
<b>Supplier</b>	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
<b>Synonym</b>	: anhydrous hydrofluoric acid; hf-a; hydrofluoric acid
<b>Material uses</b>	: Other non-specified industry: ALUMINUM PRODUCTION; FLUOROCARBONS; PICKLING STAINLESS STEEL; ETCHING GLASS; ACIDIZING OIL WELLS; FLUORIDES; GASOLINE PRODCUTION (ALKYLATION); PROCESSING URANIUM.
<b>MSDS #</b>	: 001077
<b>Date of Preparation/ Revision</b>	: <b>4/26/2014.</b>
<b>In case of emergency</b>	: 1-866-734-3438

## Section 2. Hazards identification

<b>Physical state</b>	: Gas. [Fuming liquid.]
<b>Emergency overview</b>	: DANGER!  HIGH PRESSURE GAS. CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF INHALED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.  Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Harmful by inhalation. Severely corrosive to the eyes, skin and respiratory system. Causes severe burns. Do not puncture or incinerate container. Do not breathe gas. Do not get in eyes or on skin or clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
<b>Target organs</b>	: May cause damage to the following organs: kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, eyes, bones, eye, lens or cornea, pancreas, pituitary gland, teeth, testes, thyroid.
<b>Potential acute health effects</b>	
<b>Eyes</b>	: Severely corrosive to the eyes. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
<b>Skin</b>	: Severely corrosive to the skin. Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
<b>Inhalation</b>	: Toxic by inhalation. Severely corrosive to the respiratory system.
<b>Ingestion</b>	: May cause burns to mouth, throat and stomach. As this product is a gas, refer to the inhalation section.
<b>Potential chronic health effects</b>	
<b>Chronic effects</b>	: May cause target organ damage, based on animal data.
<b>Target organs</b>	: May cause damage to the following organs: kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, eyes, bones, eye, lens or cornea, pancreas, pituitary gland, teeth, testes, thyroid.
<b>Medical conditions aggravated by over-exposure</b>	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
<b>See toxicological information (Section 11)</b>	

## Section 3. Composition, Information on Ingredients

### United States

#### Name

Hydrofluoric acid

#### CAS number

7664-39-3

#### % Volume

100

#### Exposure limits

**ACGIH TLV (United States, 3/2012).**

**Absorbed through skin. Notes: as F**

C: 2 ppm, (as F)

TWA: 0.5 ppm, (as F) 8 hours.

**NIOSH REL (United States, 1/2013). Notes: as F**

CEIL: 5 mg/m<sup>3</sup>, (as F) 15 minutes.

CEIL: 6 ppm, (as F) 15 minutes.

TWA: 2.5 mg/m<sup>3</sup>, (as F) 10 hours.

TWA: 3 ppm, (as F) 10 hours.

**OSHA PEL (United States, 6/2010). Notes: as F**

TWA: 2.5 mg/m<sup>3</sup>, (as F) 8 hours.

**OSHA PEL 1989 (United States, 3/1989).**

**Notes: as F**

STEL: 6 ppm, (as F) 15 minutes.

TWA: 3 ppm, (as F) 8 hours.

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

TWA: 3 ppm 8 hours.

## Section 4. First aid measures

#### Eye contact

- : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. 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. Clean shoes thoroughly before reuse. Get medical attention immediately.

#### Inhalation

- : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

#### Ingestion

- : As this product is a gas, refer to the inhalation section.

## Section 5. Fire-fighting measures

#### Flammability of the product

- : Non-flammable.

#### Products of combustion

- : Decomposition products may include the following materials: halogenated compounds

#### Extinguishing media

##### Suitable

- : Use an extinguishing agent suitable for the surrounding fire.

##### Not suitable

- : None known.

#### Special exposure hazards

- : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

#### Special protective

#### equipment for fire-fighters

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

## Section 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Contains gas under pressure. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Protect from sunlight. Keep container tightly closed and sealed until ready for use.

## Section 8. Exposure controls/personal protection

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- 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. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- 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.

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- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

### Product name

### Exposure limits

### United States

Hydrofluoric acid

**ACGIH TLV (United States, 3/2012). Absorbed through skin. Notes: as F**

C: 2 ppm, (as F)

TWA: 0.5 ppm, (as F) 8 hours.

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TWA: 3 ppm 8 hours.

## Section 9. Physical and chemical properties

- Physical state** : Gas. [Fuming liquid.]
- Color** : Colorless.
- Odor** : Pungent.
- Molecular weight** : 20.01 g/mole
- Molecular formula** : F-H
- Boiling/condensation point** : 20°C (68°F)
- Melting/freezing point** : -83°C (-117.4°F)
- Critical temperature** : 188°C (370.4°F)
- Vapor density** : 0.7 (Air = 1)
- VOC** : 0 % (w/w)

## Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with the following materials: alkalis.  
Reactive or incompatible with the following materials: metals.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
Hydrofluoric acid	LC50 Inhalation Gas.	Rat	1276 ppm	1 hours
<b>IDLH</b>	: 30 ppm			

## Hydrogen Fluoride

**Chronic effects on humans** : **CARCINOGENIC EFFECTS:** A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC.  
May cause damage to the following organs: kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, eyes, bones, eye, lens or cornea, pancreas, pituitary gland, teeth, testes, thyroid.

**Other toxic effects on humans** : Extremely hazardous by the following route of exposure: 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

### Aquatic ecotoxicity

Not available.

## Section 13. Disposal considerations

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

**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

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information

Hydrogen Fluoride

DOT Classification

UN1052

HYDROGEN  
FLUORIDE,  
ANHYDROUS RQ

8

I



Inhalation  
hazard zone C

**Reportable  
quantity**

100 lbs / 45.4  
kg  
Package sizes  
shipped in  
quantities less  
than the  
product  
reportable  
quantity are  
not subject to  
the RQ  
(reportable  
quantity)  
transportation  
requirements.

**Limited  
quantity**

Yes.

**Packaging  
instruction**

**Passenger  
aircraft**





Quantity  
limitation:  
Forbidden.

**Cargo aircraft**

Quantity  
limitation:  
Forbidden.

**Special  
provisions**

3, B7, B46,  
B71, B77, T10,  
TP2, T6

Hydrogen Fluoride						
TDG Classification	UN1052	HYDROGEN FLUORIDE, ANHYDROUS	8	I	 	<p><b><u>Explosive Limit and Limited Quantity Index</u></b> 0</p> <p><b><u>ERAP Index</u></b> 1000</p> <p><b><u>Passenger Carrying Ship Index</u></b> Forbidden</p> <p><b><u>Passenger Carrying Road or Rail Index</u></b> Forbidden</p>
Mexico Classification	UN1052	HYDROGEN FLUORIDE, ANHYDROUS RQ	8	I	 	<p>Inhalation hazard zone C</p> <p><b><u>Reportable quantity</u></b> 100 lbs / 45.4 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.</p> <p><b><u>Limited quantity</u></b> Yes.</p> <p><b><u>Packaging instruction</u></b> <b>Passenger aircraft</b> Quantity limitation: Forbidden.</p> <p><b>Cargo aircraft</b> Quantity limitation: Forbidden.</p> <p><b><u>Special provisions</u></b> 3, B7, B46, B71, B77, T10, TP2, T6</p>

Hydrogen Fluoride						

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

HCS Classification	: Compressed gas Toxic material Corrosive material Target organ effects
U.S. Federal regulations	: <b>TSCA 8(a) CDR Exempt/Partial exemption:</b> Not determined <b>United States inventory (TSCA 8b):</b> This material is listed or exempted. <b>Commerce control list precursor:</b> Hydrofluoric acid <b>SARA 302/304:</b> Hydrofluoric acid <b>SARA 311/312 Hazards identification:</b> Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard <b>Clean Water Act (CWA) 311:</b> Hydrofluoric acid <b>Clean Air Act (CAA) 112 accidental release prevention - Toxic Substances:</b> Hydrogen Fluoride <b>Clean Air Act (CAA) 112 regulated toxic substances:</b> Hydrofluoric acid

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	: Hydrofluoric acid	7664-39-3	100
Supplier notification	: Hydrofluoric acid	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	: <b>Connecticut Carcinogen Reporting:</b> This material is not listed. <b>Connecticut Hazardous Material Survey:</b> This material is not listed. <b>Florida substances:</b> This material is not listed. <b>Illinois Chemical Safety Act:</b> This material is not listed. <b>Illinois Toxic Substances Disclosure to Employee Act:</b> This material is not listed. <b>Louisiana Reporting:</b> This material is not listed. <b>Louisiana Spill:</b> This material is not listed. <b>Massachusetts Spill:</b> This material is not listed. <b>Massachusetts Substances:</b> This material is listed. <b>Michigan Critical Material:</b> This material is not listed. <b>Minnesota Hazardous Substances:</b> This material is not listed. <b>New Jersey Hazardous Substances:</b> This material is listed. <b>New Jersey Spill:</b> This material is not listed. <b>New Jersey Toxic Catastrophe Prevention Act:</b> This material is listed. <b>New York Acutely Hazardous Substances:</b> This material is listed. <b>New York Toxic Chemical Release Reporting:</b> This material is not listed. <b>Pennsylvania RTK Hazardous Substances:</b> This material is listed. <b>Rhode Island Hazardous Substances:</b> This material is not listed.
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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 material <b>CEPA Toxic substances:</b> This material is listed. <b>Canadian ARET:</b> This material is not listed. <b>Canadian NPRI:</b> This material is listed. <b>Alberta Designated Substances:</b> This material is not listed. <b>Ontario Designated Substances:</b> This material is not listed. <b>Quebec Designated Substances:</b> This material is not listed.
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Section 16. Other information

Label requirements

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HIGH PRESSURE GAS. CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF INHALED. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.)	:	Health	*	4
		Flammability		0
		Physical hazards		2



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.