



Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

# **SAFETY DATA SHEET**

## **HYDROFLUORIC ACID, 40-50%**

### **1. Identification**

**Product identifier:** Hydrofluoric Acid 49%

**Product Code Number:** HF200

**Trade Name:** Hydrofluoric Acid

**Synonyms:** Fluorohydric Acid, Fluoric Acid, Hydrogen Fluoride Solution

**Chemical Formula:** HF in Aqueous Solution

**Product Use:** Process chemical, laboratory and scientific research and development

**Restrictions on use:** None known.

**Company Identification:** Corco Chemical Corporation  
299 Cedar Lane  
Fairless Hills, PA 19030  
Phone: 215-295-5006  
Fax: 215-295-0781

**24 Hour Emergency Telephone Number:**

**CHEMTREC (U.S.):** 1-800-424-9300

**CHEMTREC (Outside U.S.):** 1-703-527-3887

**SDS Date of Preparation:** 07/31/2024

### **2. Hazard(s) identification**

**Classification of the Substance or Mixture:**

Acute Dermal Toxicity Category 1

Acute Inhalation Toxicity Category 2

Acute Oral Toxicity Category 2

Eye Damage Category 1

Skin Corrosion Category 1A

**Label Elements:**

Danger!

**Hazard Statements:**

H300 Fatal if swallowed.

H310 Fatal in contact with skin.

H314 Causes severe skin burns and eye damage.

H330 Fatal if inhaled.

**Precautionary Statements:**

P260 Do not breathe mist or vapors.

P262 Do not get in eyes, on skin, or on clothing.

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

P280 Wear protective gloves, protective clothing, eye protection and face protection.

P284 In case of inadequate ventilation wear respiratory protection.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P310 Immediately call POISON CENTER or doctor.

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.

P310 Immediately call POISON CENTER or doctor.

P363 Wash contaminated clothing before reuse.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.

P310 Immediately call POISON CENTER or doctor.

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor.

P330 Rinse mouth.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P501 Dispose of contents and container in accordance with local and national regulations.

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

### 3. Composition/information on ingredients

Ingredient	CAS Number	Percent	Hazardous Chemical
Water	7732-18-5	40-99%	No



Hydrogen Fluoride	7664-39-3	≤60%	Yes
-------------------	-----------	------	-----

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

## 4. First-aid measures

*For any route of contact: Detailed First Aid procedure should be planned before beginning work with HF. In all cases, immediately call a POISON CENTER or doctor.*

**Inhalation:** 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.

**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:

- 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.
- 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.

**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 irrigation 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.

**Ingestion:** 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.

**Most important symptoms/effects, 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.

**Indication of immediate medical attention and special treatment, if necessary:** 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.

**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.)

## 5. Fire-fighting measures

**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.

**Specific hazards arising from the chemical:** 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.

**Special protective equipment and precautions for fire-Fighters:** 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.



## 6. Accidental release measures

**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.

**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.

## 7. Handling and storage

**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.

**Conditions for safe storage, including any incompatibilities:** 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.

## 8. Exposure controls/personal protection

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



3 ppm TWA OSHA PEL
--------------------

**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:**

**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.)

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

**Eye 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.

## 9. Physical and chemical properties

**Appearance:** Colorless, fuming liquid

**Odor:** Acrid odor - do not breathe fumes

**Odor Threshold:** No information found

**pH:** 1.0 (0.1M solution)

**% Volatiles by volume @ 21°C (70°F):** 100 (as water and acid)

**Melting Point/Freezing Point:** < -36°C (< -33°F)

**Boiling Point / Boiling Range:** 108°C (226°F)

**Flash Point:** Not applicable

**Evaporation Rate (BuAC=1):** Not determined

**Flammability (solid, gas):** Not applicable

**Upper / Lower Flammability or Explosive Limits:** Not applicable

**Vapor Pressure (mm Hg):** 25 @ 20°C (68°F)

**Vapor Density (Air=1):** 1.97

**Relative Density:** 1.153 g/cc for 49 - 50% Hydrofluoric Acid solution

**Solubility:** Infinitely soluble

**Partition Coefficient: n-octanol / water:** No data available





**Auto-ignition Temperature:** No data available

**Decomposition Temperature:** No data available

**Viscosity:** 1.4 cPs

## 10. Stability and reactivity

**Reactivity:** Not available.

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

**Possibility of hazardous reactions:** Reacts with most common metals to form flammable, explosive hydrogen gas. Reacts with bases generating heat.

**Conditions to avoid:** Avoid excessive heat and elevated temperatures.

**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.

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

## 11. Toxicological information

### Potential Health Effects:

**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.**

**Inhalation:** 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 Contact:** 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.

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

**Ingestion:** Swallowing product will cause severe burns to the mouth, throat and gastrointestinal tract with vomiting, abdominal pain and shock. Systemic poisoning may result. Hypocalcemia, hypomagnesemia, pulmonary edema, metabolic acidosis, ventricular arrhythmias and death are possible.

**Chronic Exposure:** 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.

**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.

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

**Reproductive Effects:** Reproductive harm is not expected from this product.

**Mutagenic Effects:** Not expected to cause mutagenic activity.

**Acute Toxicity:**

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

## 12. Ecological information

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

**Persistence and degradability:** Hydrofluoric acid is an inorganic compound and not subject to biodegradation.

**Bioaccumulative potential:** No further relevant information available.

**Mobility in soil:** This product is water soluble and will move readily in soil and water. If the pH is >> 6.5, soil can bind fluorides tightly. High Calcium content will immobilize fluorides, which can be damaging to plants when present in acid soils.





**Other adverse effects:** None known.

### **13. Disposal considerations**

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.

### **14. Transportation Information**

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

### **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  $\leq 60\%$ ). 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       $\leq 60\%$

**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:**

<b>Country(s) or region</b>	<b>Inventory name</b>	<b>On inventory (yes/no)*</b>
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)

## **16. Other information**

**Date of Current Revision:** 07/31/2024

**Revision Summary:** Updated all sections.

**Date of Previous Revision:** 11/25/19

**Disclaimer - The information in the SDS is based on the data available at the time. While believed to be accurate, Corco does not claim it to be all inclusive. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. It is not intended to provide product performance or applicability information, and no express or implied warranty of any kind is made**



**with respect to the product, the underlying product data, or the information contained herein. We will not provide advice on such matters, or be responsible for any injury or damage resulting from the use of the product described herein.**