

HYDROFLUORIC ACID (40%/60%/70% AQUEOUS SOLUTION)

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SECTION 1: IDENTIFICATION

1.1 GHS Product identifier:

HYDROFLUORIC ACID (40%/60%/70% AQUEOUS SOLUTION)
Synonyms: Hydrogen fluoride solution; Fluorohydric acid
CAS: 7664-39-3

Other means of identification:

Not relevant

1.2 Recommended use of the chemical and restrictions on use:

Relevant uses: Metal surface treatment/pickling, glass etching, silicon wafer processing, chemical intermediate for fluorochemical manufacture, oil-well acidizing. For industrial user only, under appropriate authorization/permit as applicable.
Uses advised against: All uses not specified in this section or in section 7.3. Not for consumer use.

1.3 Supplier's details:

SURAJ CHEMICALS
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1.4 Emergency phone number:

Emergency Contact No: +91 - 7092722822, +91 - 9840284032

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), based on the published harmonized classification for hydrofluoric acid solutions at the concentration range supplied (40–70%, all above the ≥7% cut-off for the most severe classification band).

Acute Tox. 2 (oral)	Acute oral toxicity, Category 2, H300
Acute Tox. 1 (dermal)	Acute dermal toxicity, Category 1, H310
Acute Tox. 2 (inhalation)	Acute inhalation toxicity, Category 2, H330
Skin Corr. 1A	Skin corrosion, Category 1A, H314

2.2 GHS label elements, including precautionary statements:

GHS: 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 dust/fume/gas/mist/vapours/spray.
P262: Do not get in eyes, on skin, or on clothing.
P264: Wash hands 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/face protection.
P284: Wear respiratory protection.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302+P350: IF ON SKIN: Gently wash with plenty of soap and water.
P303+P361+P353: IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.
P320: Specific treatment is urgent (see calcium gluconate gel/supplemental information on this label).
P322: Specific measures (see supplemental first aid instructions on this label).
P361+P364: Take off immediately all contaminated clothing and wash it before reuse.
P405: Store locked up.
P501: Dispose of contents/container in accordance with local/national regulations on hazardous waste.

2.3 Other hazards which do not result in classification:

Hydrofluoric acid burns may not be immediately painful, especially at lower concentrations, and tissue damage (including deep, progressive necrosis and systemic fluoride poisoning affecting calcium/magnesium metabolism and the heart) can develop with a delay. Any skin contact, however minor it appears, requires immediate medical attention. Not assessed as PBT/vPvB (inorganic acid).

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances:

Chemical description: Aqueous solution of hydrogen fluoride
In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 7664-39-3	Hydrogen fluoride — Acute Tox. 2: H300, H330; Acute Tox. 1: H310; Skin Corr. 1A: H314 – Danger	40%, 60% or 70% (w/w) as supplied, balance water
CAS: 7732-18-5	Water – Not classified	Balance

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

3.2 Mixtures:

Supplied as an aqueous solution at the stated nominal concentration; exact assay per batch is given in the certificate of analysis – see current specification sheet.

SECTION 4: FIRST AID MEASURES

4.1 Description of necessary first-aid measures:

This is a medical emergency in all cases of exposure – obtain emergency medical assistance immediately, showing the SDS of this product. Specialised treatment (e.g. calcium gluconate gel/injection) is required and should be initiated under medical direction as soon as possible.

By inhalation:

Remove the person affected to fresh air immediately, keeping them warm and at rest. If breathing has stopped, give artificial respiration (avoid mouth-to-mouth if contamination risk exists). Obtain emergency medical attention immediately – pulmonary oedema may develop with a delay.

By skin contact:

Remove contaminated clothing immediately while flushing affected skin with copious amounts of water for at least 20 minutes. Apply calcium gluconate gel if available and trained to do so. Obtain emergency medical attention immediately, even if the burn initially appears minor or is painless – this product is fatal in contact with skin.

By eye contact:

Rinse immediately and thoroughly with copious amounts of water for at least 20 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Obtain emergency medical attention immediately.

By ingestion/aspiration:

Do NOT induce vomiting. Rinse mouth with water if the person is conscious; give calcium-containing liquid (e.g. milk) if available and the person can swallow safely. Obtain emergency medical attention immediately – fatal if swallowed.

4.2 Most important symptoms/effects, acute and delayed:

Acute and delayed effects are indicated in sections 2 and 11. Systemic fluoride absorption can cause life-threatening hypocalcaemia, hypomagnesaemia and cardiac arrhythmia, which may be delayed in onset.

4.3 Indication of immediate medical attention and special treatment needed, if necessary:

Specific treatment with calcium gluconate (topical gel, local infiltration, intra-arterial or intravenous as clinically indicated) is required under medical supervision. Cardiac monitoring is recommended for any significant exposure. No first-aid measure is a substitute for this immediate professional medical treatment.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Suitable extinguishing media:

Suitable: Water spray/fog in large quantities (from a safe distance), dry chemical powder, carbon dioxide, as appropriate to the surrounding fire.
Unsuitable: None known specific to this product; select per surrounding materials.

5.2 Specific hazards arising from the chemical:

Non-flammable aqueous solution. On heating, releases toxic and corrosive hydrogen fluoride fumes. Reacts with many metals (including most common structural metals) to generate flammable/explosive hydrogen gas.

5.3 Special protective actions for fire-fighters:

Evacuate all non-essential personnel. Wear SCBA and full chemical-protective suit rated for hydrofluoric acid. Cool containers with water spray from a safe, upwind distance if it can be done without risk. Contain fire-fighting run-off, preventing entry into drains/watercourses.

Additional provisions:

Be aware of hydrogen gas accumulation where the acid has contacted metals, which presents an additional fire/explosion hazard.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:

Evacuate the area immediately. Do not touch spilled material. Use full PPE described in section 8 before any intervention.

For emergency responders:

Only trained personnel in full acid-resistant protective equipment, including supplied-air respiratory protection, should approach the spill. Keep all unprotected persons away, establishing an exclusion zone.

6.2 Environmental precautions:

Prevent at all costs any entry into drains, watercourses or soil. Notify environmental/regulatory authorities immediately in the event of any release to the environment.

6.3 Methods and materials for containment and cleaning up:

Contain the spill using inert, acid-compatible absorbent material; neutralize cautiously with agricultural lime or soda ash under controlled conditions by trained personnel only (reaction can generate heat and gas). Place neutralized/absorbed material in a clean, dry, chemically compatible, labelled container for disposal by a licensed hazardous-waste handler. Flush the affected area thoroughly with water afterward, containing all run-off.

6.4 Reference to other sections:

See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling:

A. General precautions for safe use:

Handle only under a controlled industrial hygiene program with engineering controls and full PPE. Avoid generating and breathing mist/vapour. Avoid all contact with skin and eyes. Use only compatible materials of construction (e.g. certain grades of polyethylene, PTFE, PVDF – avoid glass and most metals).

B. Technical recommendations for the prevention of fires and explosions:

Avoid contact with metals, which generates flammable hydrogen gas; ensure adequate ventilation to prevent hydrogen accumulation in enclosed spaces.

C. Technical recommendations on general occupational hygiene:

Do not eat, drink or smoke in areas where this product is handled. Wash hands and exposed skin thoroughly after use and before breaks. Calcium gluconate gel should be kept readily available at the point of use. Personnel must be trained to recognise and immediately report any possible exposure, however minor.

D. Technical recommendations to prevent environmental risks:

Prevent any release to drains, watercourses or soil. Treat process effluent containing fluoride per applicable discharge-consent/effluent-treatment requirements before release.

7.2 Conditions for safe storage, including any incompatibilities:

A. Specific storage requirements:

Minimum Temp.	5°C
Maximum Temp.	30°C
Maximum time	12 Months (unopened, original packaging)

B. General conditions for storage:

Store in a cool, dry, well-ventilated place in compatible plastic (e.g. HDPE/PTFE-lined) containers only – never in glass or unlined metal containers. Keep locked up and restricted to authorized, trained personnel only. Provide secondary containment and segregate from incompatible materials (metals, strong bases, strong oxidizers).

7.3 Specific end use(s):

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product; users should follow their applicable process safety and effluent-treatment protocols.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters:

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948, as amended, and international reference values:

Identification	Occupational Exposure Limit Type	Value
Hydrogen fluoride, as F	Time Weighted average concentration (8 hrs)	1.8 mg/m³ (2.5 ppm, skin notation; per published international guidance)

CAS: 7664-39-3	Short-term exposure limit (ceiling)	2.5 mg/m³ (3 ppm, typical ceiling per published international guidance)
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8.2 Appropriate engineering controls:

Use fully enclosed systems and local exhaust ventilation to keep airborne concentrations as low as reasonably achievable, well below occupational exposure limits. PPE is a supplement to, not a substitute for, engineering controls.

B. Respiratory protection:

Full-face, supplied-air respirator or SCBA for any operation with potential for vapour/mist release; air-purifying respirators with acid-gas cartridges may only be used where concentrations are known to be well controlled and below IDLH.

C. Specific protection for the hands:

Chemical-resistant gloves specifically rated for hydrofluoric acid (e.g. heavyweight neoprene or butyl rubber of adequate thickness – verify breakthrough time with glove manufacturer). Replace immediately at any sign of damage.

D. Eye and face protection:

Chemical splash goggles and full face shield; do not rely on goggles alone where splash risk exists.

E. Bodily protection:

Full acid-resistant protective suit, apron and boots. Launder or dispose of contaminated clothing per a documented decontamination procedure.

F. Additional emergency measures:

Emergency shower and eyewash stations must be immediately available and tested regularly. Calcium gluconate gel must be stocked and readily accessible at all points of use.

Environmental exposure controls:

All process effluent containing fluoride must be treated (e.g. precipitation as calcium fluoride) before discharge, per applicable consent conditions.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

Appearance	
Physical state at 20°C	Liquid (aqueous solution)
Appearance	Clear, colorless liquid, fumes in moist air
Color	Colorless
Odor	Strong, sharp, irritating odor
Odour threshold	Typical value – refer to current specification sheet (very low, sub-ppm)
Volatility	
Boiling point at atmospheric pressure	~19.5°C (pure HF); solution boiling point typical value – refer to current specification sheet
Vapour pressure at 20°C / 50°C	Typical value – refer to current specification sheet (significant; volatile acid)
Evaporation rate at 20°C	Typical value – refer to current specification sheet
Product Description	
Density / Relative density at 20°C	~1.13 (40%) – 1.17 (70%), typical
Dynamic / Kinematic viscosity	Typical value – refer to current specification sheet
Concentration	40%, 60% or 70% (w/w) as supplied
pH	<1 (strongly acidic, though a weak acid by dissociation constant)
Vapour density at 20°C	Typical value – refer to current specification sheet
Partition coefficient n-octanol/water 20°C	Not relevant (inorganic) *
Solubility in water at 20°C	Fully miscible
Decomposition temperature	Not relevant *
Melting point/freezing point	Typical value – refer to current specification sheet (below 0°C for these concentrations)
Flammability	
Flash Point	Non-applicable (aqueous solution, not flammable)
Flammability (solid, gas)	Not applicable (liquid, non-flammable); generates flammable hydrogen on contact with metals
Autoignition temperature	Not relevant *
Lower / Upper flammability limit	Not relevant *
Particle Characteristics	
Median equivalent diameter	Non-applicable (liquid)

* Not relevant due to the nature of the product, not providing information on the properties of its hazards.

9.2 Other information:

Explosive properties	Not relevant *; generates flammable/explosive hydrogen with metals
Oxidising properties	Not an oxidizer; not classified
Corrosive to metals	Highly corrosive to glass, ceramics and most common metals
Heat of combustion	Not relevant *
Surface tension at 20°C	Typical value – refer to current specification sheet
Refraction index	Typical value – refer to current specification sheet

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity:

Highly reactive. Attacks glass, ceramics, concrete and most metals, generating flammable hydrogen gas and metal fluorides. Reacts violently/exothermically with strong bases. Reacts with many organic and inorganic materials.

10.2 Chemical stability:

Stable in compatible plastic containers under recommended storage conditions. Attacks and is not stable in glass or most metal containers.

10.3 Possibility of hazardous reactions:

Contact with metals generates flammable/explosive hydrogen gas, which can accumulate in enclosed spaces. Contact with strong bases causes a vigorous, exothermic neutralization reaction.

10.4 Conditions to avoid:

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity

Not applicable	Fumes in moist air	Increases vapour release/corrosivity	No special precautions	Non-applicable (aqueous solution)
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10.5 Incompatible materials:

Metals	Glass / Ceramics	Strong Bases	Strong Oxidizers	Organic Materials
Avoid contact – generates H ₂ gas	Avoid contact – corrodes/etches	Avoid contact – violent exothermic reaction	Avoid contact	Avoid contact

10.6 Hazardous decomposition products:

Toxic and corrosive hydrogen fluoride fumes on heating; flammable hydrogen gas on contact with metals.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

This substance presents extremely severe acute hazards at the concentrations supplied (40–70%):

A. Ingestion (acute effect):

Fatal if swallowed. Causes severe corrosive burns to the mouth, throat, oesophagus and gastrointestinal tract; systemic fluoride toxicity (hypocalcaemia, cardiac arrhythmia) can be rapidly fatal even with small quantities.

B. Inhalation (acute effect):

Fatal if inhaled. Causes severe irritation/corrosion of the respiratory tract; may cause delayed-onset pulmonary oedema, which can be fatal.

C. Contact with skin and eyes (acute effect):

Fatal in contact with skin. Causes severe, deep, progressive burns that may not be immediately painful, together with life-threatening systemic fluoride absorption even from relatively small exposed skin areas at these concentrations. Causes serious eye damage, with risk of blindness.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity):

Classification criteria for carcinogenicity, mutagenicity and reproductive toxicity are not met based on available data.

E. Sensitizing effects:

Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure:

Systemic fluoride toxicity (cardiotoxicity via hypocalcaemia/hypomagnesaemia) is covered under acute toxicity classification; this is the primary cause of fatality following significant exposure.

G. Specific target organ toxicity (STOT) – repeated exposure:

Chronic excessive fluoride exposure is associated with skeletal fluorosis; classification criteria for STOT RE are not met for this product based on available data at anticipated occupational exposure levels.

H. Aspiration hazard:

Classification criteria are not met based on available data.

Product-specific toxicological information:

Identification	Acute Toxicity	Genus
Hydrofluoric acid (as HF, concentrated solution) CAS: 7664-39-3	LD50 oral: 15 – 30 mg/kg (as HF)	Rat
	LD50 dermal: <20 mg/kg (as HF, concentrated)	Rabbit
	LC50 inhalation: 0.95 mg/L (1h, as HF)	Rat

SECTION 12: ECOLOGICAL INFORMATION

Harmful to aquatic life due to acute acidic/fluoride toxicity; pH extreme causes significant localized ecological impact even without specific aquatic-hazard classification.

12.1 Toxicity:

Identification	Acute Toxicity	Species	Genus
Hydrofluoric acid (as F) CAS: 7664-39-3	LC50: 2.6 – 51 mg/L (96h, pH/hardness dependent)	Non-applicable	Fish
	EC50: Typical value – refer to current specification sheet	Non-applicable	Crustacean

12.2 Persistence and degradability:

Inorganic acid; not subject to biodegradation. Rapidly dissociates/dilutes and neutralizes in the environment.

12.3 Bioaccumulative potential:

Fluoride does not significantly bioaccumulate in soft tissue, though it can accumulate in bone/skeletal tissue with chronic exposure.

12.4 Mobility in soil:

Koc	Henry	Dry Soil	Moist Soil
Non-applicable (inorganic)	Non-applicable	High (highly water soluble)	High (highly water soluble)

12.5 Results of PBT and vPvB assessment:

The standard organic PBT/vPvB framework does not apply to this inorganic substance.

12.6 Other adverse effects:

Not described

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Disposal methods:

Must be disposed of only via a licensed hazardous-waste handler. Neutralize cautiously (e.g. with agricultural lime, forming relatively insoluble calcium fluoride) under controlled conditions by trained personnel before any further treatment/disposal. Must not be discharged to drains, watercourses or general waste under any circumstances. For packaging: dispose of as hazardous waste; do not reuse or rinse to drain.

Refer to national and local hazardous-waste regulations.

SECTION 14: TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023):

14.1 UN number	UN1790
14.2 UN proper shipping name	HYDROFLUORIC ACID
14.3 Transport hazard class(es)	8 (Subsidiary: 6.1)
14.4 Packing group	I (≥60% strength) / II (40% strength) – refer to current specification sheet for exact grade
14.5 Environmental hazard	No
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG 41-22):

14.1 UN number	UN1790
14.2 UN proper shipping name	HYDROFLUORIC ACID

14.3 Transport hazard class(es)	8 (Subsidiary: 6.1)
14.4 Packing group	I (≥60% strength) / II (40% strength)
14.5 Marine pollutant	No
14.6 Special precautions for user	EmS Codes: F-A, S-B
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO 2024):

14.1 UN number	UN1790
14.2 UN proper shipping name	HYDROFLUORIC ACID
14.3 Transport hazard class(es)	8 (Subsidiary: 6.1)
14.4 Packing group	I (≥60% strength) / II (40% strength)
14.5 Environmental hazard	No
14.6 Special precautions for user	Significant restrictions/forbidden on passenger aircraft at higher packing groups – confirm current IATA restrictions
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations specific for the product in question:

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product. Given its extreme acute hazard, use should be restricted to essential industrial applications with a documented emergency response and medical treatment plan (including on-site calcium gluconate) in place before handling begins.

Other legislation:

- Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
- The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
- Public Liability Insurance Act, 1991

SECTION 16: OTHER INFORMATION

Legislation related to safety data sheets:

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3:

- H300: Fatal if swallowed.
- H310: Fatal in contact with skin.
- H314: Causes severe skin burns and eye damage.
- H330: Fatal if inhaled.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training:

Personnel handling this product must receive specific, documented training on the extreme hazards of hydrofluoric acid, correct PPE use, emergency first-aid procedures (including calcium gluconate use) and spill response, before any handling begins; this is not a substitute for a site-specific risk assessment and emergency plan.

Principal bibliographical sources:

United Nations GHS (Rev. 8); European Chemicals Agency (ECHA) classification and labelling inventory (harmonized Annex VI classification for hydrogen fluoride); publicly available chemical supplier safety data sheets for this CAS number.

Abbreviations and acronyms:

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50

The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

END OF SAFETY DATA SHEET