

Material Safety Data Sheet

Issue: 01-06-2013

Rev. : 02

HYDROFLUORIC ACID In 40 % Water Solution

1. Product and Company identification

1.1 Substance identification

Chemical name	:	HYDROFLUORIC ACID
Commercial name	:	HYDROFLUORIC ACID
C.A.S. Nr.	:	7664 - 39 - 3
C.E.E. Nr.	:	009-003-00- 1
EINECS Nr.	:	231-634-8
Chemical formula	:	HF
Molecular weight	:	20,006
Registration number	:	01- 2119458860-33-0011

1.2 Fields of application

Hydrofluoric acid is mainly used as an intermediate, catalyst in alkylation reactions, mining, enrichment and purification of minerals, metals and materials, passivation of metal surface, construction industry, formulation and preparation of diluted HF, industrial cleaning of drums and pipelines, solar industry and laboratory use.

Use advised against

Not known by the registrant

1.3 Company identification

Company name	:	CARINI CHEM SRL
Address	:	S.S. 9 Emilia 353 29017 Fiorenzuola d'Arda (PC) - Italia
Phone Nr.	:	+39 0523 241152
Fax Nr.	:	+39 0523 240612
E-mail	:	info@carinichem.it

1.4 Emergency phone number

Emergencies	:	+39 03523 241152 (office working hours)
47828 (24 hh.)	:	

2. Hazard identification

2.1 Classification of the substance

2.1.1 Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]:

Acute Tox. 2 – Oral toxicity Acute Tox. 1 – Cute toxicity Acute Tox. 2 – Inhalation toxicity Skin Corr. 1A

2.1.2 Classification according to Directive 67/548/EEC:

T+, Very Toxic R26/27/28
C, Corrosive R35

2.2 Label elements

2.2.1 Labelling according Regulation (EC) N° 1272/2008 [CLP]

GHS Pictograms

GHS05 GHS06

Signal word: Danger

Hazard statements

H330 Fatal if inhaled

H310 Fatal in contact with skin

H300 Fatal if swallowed

H314 Causes severe skin burns and eye damage

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection P310 Immediately call a POISON CENTER or doctor/physician. P301+330+331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

P303+361+353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+351+338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

2.2.2 Labelling according Regulation (EC) N° 67/548/CE

Risk indication

C Corrosive

T+ Very Toxic

Risk word (R)

R26/27/28 – Very toxic by inhalation, in contact with skin and if swallowed

R35 – Causes severe burns

Caution advice (S)

S 1/2 - Keep locked up and out of the reach of children

S 7/9 - Keep container tightly closed and in a well-ventilated place

S 26 - In case of eye contact wash immediately and abundantly with water and seek medical attention. S 36/37/39

- Wear suitable protective clothing, gloves and eye/face protection

S 45 - In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)

2.3 Other hazards

In presence of humid air in contact with metals produces hydrogen with a consequent risk of explosion.

3. Composition of product

Nome HYDROFLUORIC ACID CAS 7664 - 39 - 3

EINECS 231-634-8

Impurities There are no impurities relevant for classification and labelling

4. First aid measures

4.1 Description of first aid measures

General Recommendations:

Personal protective equipment (respirator, gloves, etc.) required for rescuers of victims, see section 7. In case of product splashing into eyes and face, treat eyes first.

Handle patient and all contaminated clothing with HF resistant gloves.

Note: The effect of HF, i.e. the onset of pain, particularly in dilute solutions, may not be felt for up to 24 hours. It is important that workers have immediate access to the antidote (calcium gluconate) both on and off the worksite in order to apply it as soon as possible. Instructions should be given for the worker not to use the gel in the eye and the worker to still seek medical attention regardless of how minor the contact. The calcium combines with the fluoride to form the insoluble calcium fluoride thus preventing the fluoride from entering the

intact skin and causing tissue damage.

Inhalation

Remove the subject from the contaminated area as soon as possible to a quiet, uncontaminated and well ventilated location. Keep warm (blanket). Administer oxygen. If patient is unconscious, give artificial respiration. Note: Mouth to mouth resuscitation is not recommended, use ambu balloon. Seek medical advice in all cases. Take to a hospital.

Skin contact

Immediately undress from contaminated clothes and wash the victim abundantly with water until complete removal of any trace of acid from the skin (at least 15 min).

Wash again with a solution of calcium gluconate 10% (in the case of a limb, keep submerged).

Put on the skin CALCIUM GLUCONATE GEL and massage for at least 15 minutes after the ache disappears, taking care that fingers will be clean.

In case of subcutaneous lesions, inject, at 1÷2 cm from caustificate zone, 1÷1,5 cc of 10% CALCIUM GLUCONATE solution, always under medical attention.

Eye contact

DO NOT DELAY. Flush the eyes with copious amounts of water or eye wash solution (sterile isotonic saline solution) until the ambulance arrives. Do not attempt to remove contact lenses. Irrigation should be continued while en route to hospital. Obtain medical attention immediately, but do not delay the above management until medical attention is available.

Swallowing

After completion of primary response (decontamination) seek urgent hospital admission. Do not induce vomiting. Mouth and lips may be rinsed with water, only if casualty is conscious.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation

The HF vapour irritates the airways, inhalation may cause injuries of varying severity depending on the duration and intensity of exposure. Symptoms include coughing, burning sensations and suffocation. Continued exposure to high concentrations results in pulmonary oedema.

Skin contact

Contact with the skin causes skin burns, (resulting in rapid tissue destruction at the site of contact) ulcers, necrosis and severe damage even permanent.

Dermal contact with liquid or gaseous HF can cause severe dermal lesions and may also result in systemic (cardiac) effects due to hypocalcaemia that can be fatal.

Direct contact must be avoided through the use of appropriate engineering control and personal protective equipment (PPE).

Eye contact

Contact with eyes causes severe burns, ulceration, necrosis and serious damage to vision loss.

Direct contact must be avoided through the use of appropriate engineering control and personal protective equipment (PPE).

Ingestion

Ingestion of HF causes, like all corrosive liquids, a direct and immediate action adversely affecting on the tissues of the oral oropharyngeal and digestive system.

4.3 Indication of any immediate medical attention and special treatment needed

Seek medical advice immediately in all cases.

5. Fire fighting measures

5.1 Extinguishing media

The product is not flammable.

Suitable extinguishing media:

Use any means suitable for extinguishing surrounding fire.

Unsuitable extinguishing media:

None.

5.2 Special hazards arising from the substance

Fire and explosion hazards

May produce dangerous fumes if involved in fire. Formation of dangerous gas in contact with water or humid air.

Formation of flammable gas (hydrogen) on contact with certain metals with risk of explosion. Contact with water may produce heat release and present risks of splashing.

5.3 Advice for fire-fighters

Special protective equipment during fire

Exposure to combustion products may be a health hazard, in the event of the fire wear self contained breathing apparatus, the personal protective equipment, full protective acid resistant suit. Cool containers exposed to fire. Approach from upwind and absorb gas/vapour with water spray.

Depending on wind direction, warn people of danger of inhalation, close doors and windows and get ventilation stopped.

Do not allow fire fighting water run-off into surface water or groundwater.

6. Measures in case of accidental spillage

Isolate affected area. Approach from upwind. Ventilate the premises. Eliminate all sources of ignition, and do not generate flames or sparks. Keep away materials and products which are incompatible with the substance. Disperse gas/vapour with water spray. To avoid excessive fuming, do not apply water directly onto the spillage but upstream or on a run off. In case of leaking container, try to reposition it to get the leak in gaseous phase. Protect intervention team with water spray. Use bagged lime to form containment. If safe to do so, without overexposing anyone, try to stop the leak.

6.1 Personal precautions, protective equipment and emergency procedures

During these operations use the mask with filter type «B GREY» for vapour of acid gas or aqualung, goggles, PVC booth, PVC gloves; overalls and hood with full head, face and neck protection.

For non-emergency personnel

Evacuate the area immediately by going in a safe place.

For emergency personnel

Evacuate personnel and limit the access to the area, intervene only after wearing the PPE provided.

6.2 Environmental precautions

Prevent the solution from flowing into drains or surface water bodies

6.3 Methods and material for containment and cleaning up

In the event of spillage of hydrofluoric acid solution, neutralize with lime, calcium carbonate or sodium bicarbonate, then wash with abundant water and remove with the normal mechanical devices. Disposal must be done according to national legislation.

6.4 Reference to other sections

For more information on protective measures refer to sections 7 and 13

7. Handling and storage

7.1 Precautions for safe handling

Operate in a well ventilated area. Use only equipment and materials which are compatible with hydrogen fluoride. Clean and dry piping circuits and equipment before any operations. Keep away from reactive products.

Where it is not possible to be present with organizing measures and procedures aimed to limit the exposition and the contact with the wet skin, it needs to use PPE such as protective overalls with full protection of head, face and neck, rubber or PVC gloves, goggles and gas masks (filter B-GREY) or aqualungs, whose efficiency must be periodically monitored.

Water intake and/or tins containing neutralizing solutions must be properly arranged into the work rooms or in

the immediate vicinity and in these places in which risk of acid run-over exists, must be installed showers and eye wash basins . Do not smoke , drink or eat in places where there is risk of exposure/contact with the product

7.2 Conditions for safe storage, including any incompatibilities

Keep vessels well closed in airy places, protected from heat and sun.

Storeroom must always be provided with water sources, having waterproof anti-corrosion electric systems and acid proof floor material with the right slope for driving the eventual washing waters in the apposite collectors.

Tins must be in contact with the floor, but standing on metallic or wooden bases, painted with apposite acid proof paints or tars.

Premises or storage places, the substance must be properly marked and separate from incompatible materials or substances such as oxidizing agents (peroxides, persalts, chromium nitrate permanganates etc.), highly alkaline (sodium hydroxide, potassium hydroxide, ammonia), substances reactive organic (acetic anhydride, Ethylenediamine, propylene oxide, etc...).

Exclude any source of ignition of flammable substances.

The building must normally be separated and isolated from other spaces or passageways.

7.3 Specific end uses

See exposure scenario

8. Exposure control / Personal protection

8.1 Control parameters

Limits of professional exposure

SCOEL

Indicator: Hydrogen fluoride

Acute inhalation (DNEL 15 min of exposure) SCOEL TLV – STEL (15min) 2,5 mg/m³

Systemic effects inhalation (DNEL 8 hours exposure) SCOEL TLV – TWA (8h) 1,5 mg/m³

DNELs for workers

Acute local effects - inhalation

DNEL : 2,5 mg/m³

Acute – systemic effects - inhalation

DNEL : 2,5 mg/m³

Long term local effects - inhalation

DNEL : 1,5 mg/m³

Long term systemic effects - inhalation

DNEL : 1,5 mg/m³

DNELs for the general population

Acute – systemic effects - inhalation

DNEL : 0,03 mg/m³

Acute – systemic effects - oral

DNEL : 0,01 mg/kg bw/day

Acute local effects - inhalation

DNEL : 1,25 mg/m³

Long term systemic effects - inhalation

DNEL : 0,03 mg/m³

Long term systemic effects - oral

DNEL : 0,01 mg/m³

Long term local effects - inhalation

DNEL : 1,25 mg/m³

PNECs

PNEC_{fresh water} 0,9 mg/L PNEC_{marine water} 0,9 mg/L PNEC_{intermittent releases} 0,9 mg/L
PNEC_{sediment fresh water} 0,766 mg/kg ww
PNEC_{soil} 11 mg/kg w
PNEC_{stp} 51 mg/L

8.2 Exposure controls

8.2.1 Control of the professional exposure

Engineering measures

Working places must be properly aired. When possible, sources of local air inlet and efficient systems of air exchange must be installed. If these systems are not enough to keep concentrations of vapours under exposure limits, use gas proof masks and complete face protection or aqualung. Use acid proof work clothes.

Keep the normal health care. Install emergency showers and eyewash basins.

Respiratory protection

Use approved respiratory protection with anti acid filter or an air stream helmet.

Hand protection

Wear protective PVC or rubber gloves.

Eye protection

Safety glasses with full side shields or goggles are recommended.

Skin protection

Use acid proof clothes. If necessary wear overalls with hood and full head, face and neck protection.

8.2.2 Control of the environmental exposure

Do not disperse the product in the environment.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	Liquid Colourless
Odour	Pungent
Odour threshold	high pH < 1
freezing point	- 49 °C
initial boiling point	112 °C
Flash point	Not flammable
Evaporation rate	10,2 mN/m a (0°C)
Upper/lower flammability or explosive limits	n.a.
Vapour pressure	917 mmHg a (25°C)
Relative density	0,97 g/L a (20°C)
Solubility	soluble
Partition coefficient: n-octanol/water	n.a.
Auto-ignition temperature	non flammable
Decomposition temperature	n.a.
Viscosity	0,256 mPas a (0 °C)
Explosive properties	non explosive
Oxidising proprieties	not oxidising
Dissociation constant	3,19 pKa a (20 °C)

9.2 Other information

None

10. Stability and reactivity

10.1 Reactivity

No decomposition if used as directed.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Decomposes giving heat. Build exothermic reaction when dissolved in water.

10.4 Conditions to avoid

Avoid contact with glass or ceramic materials. Contact with water generates heat releasing toxic and corrosive white smoke. Attacks many metals with evolution of hydrogen gas is extremely flammable and explosive.

Reacts violently with oxidizing substances with the development of highly toxic fluorine gas.

10.5 Incompatible materials

It reacts violently with:

Oxidizing agents (peroxides, persalts, chrome permanganates nitrates etc.). Strongly alkaline (sodium hydroxide, potassium hydroxide, ammonia).

Reactive organic substances (acetic anhydride, ethylene, propylene oxide, etc...) He has a huge dissolving power against the silica (glass, ceramics, silicates).

10.6 Hazardous decomposition products

In the presence of moisture in contact with metals it can react to produce hydrogen with a consequent risk of explosion.

11. Toxicological information

11.1 Information on toxicological effects

Relevant hazard class	Effect dose	Remark
Acute oral toxicity	n.a.	The substance is classified in the EU as "corrosive and very toxic".
Acute dermal toxicity	n.a.	The substance is classified in the EU as "corrosive and very toxic".
Inhalative toxicity	(5 min) > 4970 mg/m ³ (15 min) > 2690 mg/m ³ (30 min) > 2040 mg/m ³ (60 min) > 1310 mg/m ³	The substance is classified in the EU as "corrosive and very toxic".
Skin corrosion/irritation	n.a.	The substance is classified in the EU as "corrosive"
Serious eye damage/irritation	n.a.	The substance is classified in the EU as "corrosive"
Respiratory or skin sensitization	n.a.	There are no data on the sensitizing properties of HF. The local effects are detected due to the properties
Germ cell mutagenicity	n.a.	Fluoride do not interact with DNA and is not genotoxic when administer by oral or inhalation
Carcinogenicity	n.a.	Not carcinogenic. All the available studies conclude that the data is sufficient to suggest that fluoride is not carcinogenic in animals.
Reproductive toxicity	NOAEL 10 mg/kg bw/day	No studies with HF are available. However a number of studies of various designs are available with the read-across substance NaF, including high quality studies performed by the US NTP and FDA. There is no evidence for the developmental toxicity of fluoride

STOT single exposure	n/a	There was no observed toxicity specific to single exposure, the effects are largely a consequence of
STOT repeated exposure	n/a	There was no observed toxicity to repeated
Aspiration hazard	n/a	n/a

12. Ecological information

12.1 Toxicity

Short-term toxicity to fish
LC50 (96h): 51 mg/L

Long-term toxicity to fish
NOEC (21d): 4 mg/L

Short-term toxicity to aquatic invertebrates fresh water
EC50 (96h): 26 mg/L

Short-term toxicity to aquatic invertebrates marine water
EC50 (96h): 10.5 mg/L

Long-term toxicity to aquatic invertebrates fresh water
EC50 (21d): 3.7-14.1 mg/L

Acute toxicity on algae and aquatic plants
EC50 (96h): 43 mg/L (based on growth rate biomass) fresh water
EC50 (96h): 81 mg/L (based on growth rate biomass) marine water

Long-term toxicity on algae and aquatic plants
NOEC (14d): 50 mg/L (based on growth rate biomass) fresh water
NOEC (21d): 50 mg/L (based on growth rate biomass) marine water

Long-term toxicity to soil macro-organisms
NOEC (22wk): 1200 mg/kg soil dw (based on growth)

Toxicity to terrestrial plants
NOEC: 0,2-0,7 mg/m³

Toxicity to soil micro-organisms
NOEC (63d): 106 mg/kg soil dw

Toxicity to aquatic micro-organism
NOEC (3h): 510 mg/L

Toxicity to birds
LD50 (24h): 17-50 mg/kg bw

12.2 Persistence and degradability

Not persistent.

12.3 Bioaccumulative potential

There is no evidence to support the effects of bioaccumulation.

12.4 Mobility in soil

During transport in soil hydrofluoric acid can be neutralized by some basic components of the soil having basic behaviour (i.e. carbonates).

12.5 Results of PBT and vPvB assessment

According to annex XIII of the REACH regulation 1907/2006/EC inorganic substances do not need to be subjected to a PBT assessment.

12.6 Other adverse effects

None

13. Considerations on waste disposal

13.1 Waste treatment methods

Unused product, residues deriving from its use and empty packages have to be disposed according to national regulations.

During handling adopt the precautions indicated at point 7.

14. Transport information

14.1 UN-Number: 1790

14.2 UN proper shipping name: UN 1790 HYDROFLUORIC ACID, 8 (6.1), II (E)

14.3 Transport hazard class(es):

ADR/RID/ADN: 8, 6.1

IMDG: 8, 6.1

IATA/ICAO: 8, 6.1

14.4 Packaging group: II

14.5 Environmental hazards:

ADR/RID/ADN – NO

IMDG - Marine pollutant: NO

14.6 Special precautions for user:

None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

Not applicable

15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance

Directive 67/(548) /EEC Classification Packaging and Labelling of dangerous substances) Regulation (EC) n° 1272/2008 (CLP);

Regulation (EU) n°453/2010 (amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH))

15.2 Chemical Safety Assessment:

For this substance a chemical safety assessment is provided.

16. Other information

Revision

First revision that replaces the previous version. This MSDS has been completely revised in accordance with regulations No. 1907/2006/EC, 1272/2008/EC and 453/2010/CE.

Main bibliography

1. IUCLID (International Uniform Chemical Information Database) Hydrogen fluoride.
2. CSR Hydrogen fluoride.

Key to abbreviations and acronyms

ACIGH: American Conference of Governmental Industrial Hygienists

ADN: Accord européen relative au transport international des marchandises dangereuses par voies de navigation

intérieures

ADR: Accord européen relative au transport international des marchandises dangereuses par route

CL 50: Lethal Concentration 50

CLP: Classification, Labelling and Packaging

CSR: Chemical Safety Report

DL 50: Lethal Dose 50

DNEL: Derived no effect level

IATA: International Air Transport Association

ICAO: International Civil Aviation Organization

IMDG: International Maritime Dangerous Goods code

PBT: Persistent, bioaccumulative and toxic PNEC: Predicted no effect concentration NOEC: No observed effect concentration

RID: Règlement concernant le transport International ferroviaire des marchandises Dangereuses

STEL: short term exposure limit

SCOEL: Scientific Committee on Occupational Exposure Limit Values

TWA: Time Weighted Average

UE: Unione Europea

vPvB: Very persistent very bioaccumulative

Additional information:

Here below are reported the use descriptors identified in sections 1.2 and 7.3. Uses by workers in industrial settings

Identified use	Process category (PROC)	Preparation Category (PC)	Sector of Use (SoU)	Environmental Release Category (ERC)
Manufacture of HF	PROC 1,8b and 9	n.a	n.a	ERC 1
Use as an intermediate	PROC 1,2,3,4,8b and 9	PC 19	SU 3, 8 and 9	ERC 6a
Use as a Catalyst in alkylation reactions	PROC 1, 2, 8b and 9	PC 20	SU 3, 8 and 9	ERC6b
Laboratory Use	PROC 15	PC 21	SU 22	ERC8a, 8b
Mining, enrichment, purification of minerals, metals and materials	PROC 1, 2, 3, 4, 13, 7, 8b, 9 and 19	PC 14, 15, 35 and 40	SU 3, 14, 15 and 2a	ERC 4 and 6b
Passivation of metal surface	PROC 1, 8b, and 9	PC 14	SU 3	ERC 5
Construction industry	PROC 3, 8a, 8b and 9	-	SU3, SU 10 and 19	ERC 2
Formulation and preparation of diluted HF	PROC 3, 5, 8b, 9, 13 and 19	-	SU3 and SU 10	ERC 2
Industrial cleaning of drums and pipelines	PROC 3, 8b, 9 and 13	PC 35	SU 3	ERC 7
Solar industry	PROC 1,2,3,4, 8b and 9	PC 15	SU 3	ERC 6b

Informative Note

Information supplied in this "Material Safety Data Sheet" is based on the best available knowledge and our experience, and it is not exhaustive. It is applied on the product exactly as it is, in case of mixture or compound make sure that no new danger can rise.

In any case people who handle the product must respect the current law and regulation related to the product, hygiene and security on work place.

The information contained in this form are a description of product characteristics for safety purpose, should not be considered as guarantee of the properties of the product itself.