Safety Data Sheet

According to Annex II to REACH - Regulation 2020/878 and to Annex II to UK REACH

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Substance name:	HYDROFLUORIC ACID 40%
Synonyms:	HYDROFLUORIC ACID in 40% aqueous solution
CAS Number	7664-39-3
CE Number	231-634-8
Index number	009-003-00-1
REACH Registration Number	01-2119458860-33-0010

1.2. Relevant identified uses of the substance or mixture and uses advised against

Uses of the Substance

Use at industrial sites	use in construction, use as an intermediate, use as a catalyst in alkylation reactions, mining, enrichment, purification of minerals and metals, passivation of metal surfaces, industrial cleaning of drums and pipes, semiconductor in the electronics and solar industry
Professional use	laboratory use
Consumer	none foreseen

Uses advised against:
The relevant uses are listed above. Other uses are not recommended unless an assessment has been carried out prior to the commencement of such use, demonstrating that the risks associated with such use are controlled.

See Annex for the full list of uses for which an exposure scenario is provided.

1.3. Details of the supplier of the safety data sheet

Name	**FLUORSID SPA**
Full address	**2 STRADA MACCHIAREDDU**
District and Country	**09032, ASSEMINI** **CAGLIARI, ITALY**
	Tel.: +39 070 246321
	Fax: +39 070 2463235
e-mail address of the competent person responsible for the Safety Data Sheet	**msds.cagliari@fluorsid.com**

1.4. Emergency telephone number

For urgent inquiries refer to
Malta 112
United Kingdom NHS 111
Ireland Members of Public: +353 (01) 809 2166. (8.00 a.m. to 10.00 p.m. 7 days a week)
Healthcare Professionals: +353 (01) 809 2566 (24 hour service)

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture
The product is classified as hazardous pursuant to the provisions set forth in (EC) Regulation 1272/2008 (CLP) (and subsequent amendments and supplements). The product thus requires a safety datasheet that complies with the provisions of (EU) Regulation 2020/878.
Any additional information concerning the risks for health and/or the environment are given in sections 11 and 12 of this sheet.

Hazard classification and indication:

Substance or mixture corrosive to metals, category 1	H290	May be corrosive to metals.
Acute toxicity, category 2	H300	Fatal if swallowed.
Acute toxicity, category 1	H310	Fatal in contact with skin.
Acute toxicity, category 2	H330	Fatal if inhaled.
Skin corrosion, category 1A	H314	Causes severe skin burns and eye damage.
Serious eye damage, category 1	H318	Causes serious eye damage.

2.2. Label elements
Hazard labelling pursuant to EC Regulation 1272/2008 (CLP) and subsequent amendments and supplements.

Hazard pictograms:

Signal words: **Danger**

Hazard statements:

H290	May be corrosive to metals.
H300+H310+H330	Fatal if swallowed, in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.

Precautionary statements:

P260	Do not breathe fume / gas / mist / vapours.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P280	Wear protective gloves/ protective clothing / eye protection / face protection.
P310	Immediately call a POISON CENTER / doctor.
P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Contains: HYDROFLUORIC ACID 40%

2.3. Other hazards
On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.
The product does not contain substances with endocrine disrupting properties in concentration ≥ 0.1%.

SECTION 3. Composition/information on ingredients

3.2. Mixtures

Contains:

Identification	Conc. %	Classification (EC) 1272/2008 (CLP)
HYDROFLUORIC ACID		
INDEX 009-003-00-1 EC 231-634-8 CAS 7664-39-3	40	Met. Corr. 1 H290, Acute Tox. 1 H310, Acute Tox. 2 H300, Acute Tox. 2 H330, Skin Corr. 1A H314, Eye Dam. 1 H318, Classification note according to Annex VI to the CLP Regulation: B Eye Irrit. 2; H319: 0,1 % ≤ C < 1 % Skin Corr. 1A; H314: C ≥ 7 % Skin Corr. 1B; H314: 1 % ≤ C < 7 % STA Oral: 5,001 mg/kg, STA Dermal: 5 mg/kg, STA Inhalation mists/powders: 0,051 mg/l, STA Inhalation vapours: 0,501 mg/l
REACH Reg. 01-2119458860-33-0010		

The full wording of hazard (H) phrases is given in section 16 of the sheet.

SECTION 4. First aid measures

4.1. Description of first aid measures

General information

- Exposures to hydrofluoric acid are typical. Serious life-threatening effects may occur immediately or within 24 hours after exposure.
- Before providing first aid or medical treatment, always decontaminate the victims of exposure.
- First-aiders should wear personal protective equipment when assisting and decontaminating victims.
- First-aiders should wear gloves before touching exposed areas or applying calcium gluconate gel to victims.
- In case of splashes on eyes and face, treat the eyes first.
- In case of exposure to hydrofluoric acid, always consult a doctor.

If inhaled

- Take the injured or exposed person out into the fresh air.
- Consult a doctor immediately.
- Administer oxygen via mask at a rate of 12 litres per minute.
- Spray a 2.5% calcium gluconate solution for at least 15-20 minutes or until the exposed person is seen by a doctor (to be alternated with oxygen).
- If calcium gluconate is not available, administer oxygen as described above until the victim is seen by a doctor.
- If breathing assistance is needed, use indirect methods such as resuscitation masks or self-expanding balloons. Do not perform mouth-to-mouth breathing.
- In case of exposure to hydrofluoric acid vapour, signs of exposure on skin and eyes are likely. Follow decontamination and first aid procedures for skin and eye exposure.
- If necessary, maintain support for vital functions.

In case of contact with the skin

- In case of skin exposure to hydrofluoric acid, go to the nearest water source or emergency shower. Turn on the water.
- During rinsing, remove all clothing, shoes and accessories.
- Finally, while keeping your eyes closed and facing the water jet, remove your goggles or respirator.
- Wear hydrofluoric acid resistant gloves when touching contaminated skin.
- Wash exposed parts for a maximum of 5 minutes if first aid treatment is immediately available. Otherwise, continue rinsing until emergency treatment becomes available.
- Apply 2.5% calcium gluconate gel or hexafluorine immediately and massage on the affected area. Continue to massage and apply the gel for at least 15 minutes after pain relief.
- In case of contact with fingers or nails, even in the absence of pain, dip them in a 2.5% calcium gluconate bath for 15-20 minutes.
- Consult a doctor as soon as possible. During transport to a medical facility or while waiting for the victim to be examined by a doctor, it is extremely important to continue to massage the calcium gluconate gel.

- If necessary, maintain support for vital functions.

In case of contact with the eyes

- Decontamination: go to the nearest clean water source and turn on the water. Ask a trained person to remove contact lenses if present (contact lenses should be prohibited), place eyes under the water jet and keep the eyelids open during rinsing.
- After rinsing, flush the eyes with a 1% calcium gluconate or Hexafluorine solution through an eye dispenser or a nasal cannula applied to the nasal bridge. Dispense 1000 cc of calcium gluconate solution or Hexafluorine in a continuous stream for at least 15 minutes, or if necessary until medical assistance is available.
- During transport to a medical facility or while waiting for the victim to be examined by a doctor, it is extremely important to continue to irrigate with calcium gluconate or Hexafluorine solution.
- Try to get a specialist medical examination and treatment as soon as possible.
- If necessary, maintain support for vital functions.

If swallowed

- If hydrofluoric acid is swallowed, the victim must immediately be transported to a medical facility. - DO NOT induce vomiting.
- If the injured or exposed person is able, rinse the mouth with calcium solution without swallowing.
- If necessary, maintain support for vital functions.

4.2. Most important symptoms and effects, both acute and delayed

In case of contact with the skin

Symptoms

- Causes severe burns.
- Metabolic imbalances
- Potentially fatal cardiac arrhythmia

Effects

- HF penetrates very quickly into any epithelial tissue or organ with which it comes into contact and does not remain on the surface.
- Initially, the exposed parts will suffer possible local damage; the effects of exposure to HA may be more extensive and affect deeper tissues and may cause the following significant complications:
- In case of lower concentrations, symptoms may be delayed and may appear even 48 hours after exposure.
- It is completely absorbed into the body where it causes acute and severe toxic systemic effects, mainly due to rapid development of hypomagnsaemia and serum hypocalcaemia and enzyme blockage.

In case of contact with the eyes

Symptoms

- Causes severe burns.
- Blindness

Effects

- HF penetrates very quickly into any tissue with which it comes into contact and does not remain on the surface.
- Initially, the substances will burn locally and then penetrate deeper tissue causing the following significant complications:
- In case of lower concentrations, symptoms may be delayed and may appear even 48 hours after exposure.
- It is completely absorbed into the body where it causes acute and severe toxic systemic effects, mainly due to rapid development of hypomagnesaemia and serum hypocalcaemia and enzyme blockage.

If inhaled

Symptoms

- Causes severe burns.
- metabolic imbalances
- pulmonary oedema
- Potentially fatal cardiac arrhythmia

Effects

- Initially, the substances will burn locally and then penetrate deeper tissue causing the following significant complications:
- In case of lower concentrations, symptoms may be delayed and may appear even 48 hours after exposure.
- It is completely absorbed into the body where it causes acute and severe toxic systemic effects, mainly due to rapid development of hypomagnesaemia and serum hypocalcaemia and enzyme blockage.

If swallowed

Effects

- In case of lower concentrations, symptoms may be delayed and may appear even 48 hours after exposure.
- It is completely absorbed into the body where it causes acute and severe toxic systemic effects, mainly due to rapid development of hypomagnesaemia and serum hypocalcaemia and enzyme blockage.

4.3. Indication of any immediate medical attention and special treatment needed

In all cases consult a doctor immediately. In case of contamination, for immediate treatment:

- emergency shower with face and eyes wash station must be installed near working area,
- the availability of 2.5% calcium gluconate solution or hexafluorine for skin treatment, and 1% calcium gluconate solution or hexafluorine must be guaranteed for eyes wash
- instruments for administering oxygen and for aerosolizing 2.5% calcium gluconate solutions for nebulisations must be installed near working area.

Systemic effects such as low blood calcium lead to abnormal heart rate/cardiac arrest. Hepatic and renal dysfunctions, chest tightness (sometimes it occurs only a few hours after exposure), pulmonary edema are also described. It is necessary to monitor signs of systemic fluoride toxicity, especially in the case of low serum calcium level, It is necessary to consider intravenous calcium gluconate inoculation as presumptive treatment for imminent systemic effects of HF (hypocalcemia is the most immediate). For more information on the substance, always refer to the international guidelines of the European Technical Committee of Fluorine (CTEF) available at the following address: http://www.eurofluor.org/.

SECTION 5. Firefighting measures

5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT
The extinguishing equipment should be of the conventional kind: carbon dioxide, foam, powder and water spray.
UNSUITABLE EXTINGUISHING EQUIPMENT
Jets of water

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE

- Not combustible.
- Dangerous decomposition products in case of fire.
- Releases hydrogen in reaction with metals.
- Reacts violently with water.

5.3. Advice for firefighters

GENERAL INFORMATION
Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Do not take any action that involves any personal risk or without adequate training. Evacuate the surrounding areas.
Wear appropriate protective equipment (including personal protective equipment referred to in section 8 of this safety data sheet) to prevent contamination of the skin, eyes and personal clothing. Wear appropriate respirator when ventilation is inadequate.
Do not inhale vapours. Avoid dispersion of the product in the environment. Follow the appropriate internal procedures for unauthorized

personnel to intervene directly in case of accidental release.
All necessary precautions must be taken so that the residue does not come into contact with water to reduce the risk of violent reactions.

For emergency personnel
Follow the appropriate internal procedures for authorized personnel.
Isolate the danger area and deny entry. Evacuate non-authorized personnel. Remove unequipped persons.
Wear a self-contained breathing apparatus before approaching the spill area.
The use of clothing that guarantees anti-acid protection of the whole body is recommended.
Do not direct jets of water directly onto gaseous phase leaks.

6.2. Environmental precautions

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up

Do not dump the product in sewers.
During the dilution process, always add the product to the water, never add water to the product.
Neutralize with limewater or soda and rinse with plenty of water.
Store in suitable closed containers for disposal.
Contact with water develops heat and presents a risk of projectionsContaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections

Any information on personal protection and disposal is given in sections 8 and 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Use only in a well-ventilated place.
Use in a closed system
Use only clean and dry tools.
Store away from water.
Preferably, transfer by pump or gravity.
Avoid inhaling, swallowing and contact with skin and eyes.
Keep away from incompatible products

Hygiene measures
Ensure that eye washers and emergency showers are close to the workstation. - Remove contaminated clothing and shoes immediately.
Wash contaminated clothing before reuse.
Avoid contact with skin
Wash hands before breaks and at the end of the working day.
Handle in accordance with good industrial hygiene and safety practices.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures/storage methods
Keep the container tightly closed.
Keep in a cool, well-ventilated place.
Keep away from heat.
Store in an area with a containment basin.
Electrical equipment must be adequately protected in accordance with the appropriate standards.
Keep in properly labelled containers.
Close carefully and store in a cool, dry, well-ventilated place.
Keep away from incompatible products

Packaging material

Suitable materials: Coated steels
Unsuitable materials: glass

7.3. Specific end use(s)
No use other than as indicated in section 1.2 of this safety data sheet

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Regulatory References:

GBR	United Kingdom	EH40/2005 Workplace exposure limits (Fourth Edition 2020)
IRL	Éire	2020 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations (2001-2015) and the Safety, Health and Welfare at Work (Carcinogens) Regulations (2001-2019)
EU	OEL EU	Directive (EU) 2022/431; Directive (EU) 2019/1831; Directive (EU) 2019/130; Directive (EU) 2019/983; Directive (EU) 2017/2398; Directive (EU) 2017/164; Directive 2009/161/EU; Directive 2006/15/EC; Directive 2004/37/EC; Directive 2000/39/EC; Directive 98/24/EC; Directive 91/322/EEC.
	TLV-ACGIH	ACGIH 2022

HYDROFLUORIC ACID

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
OELV	IRL	1,5	1,8	2,5	3	
WEL	GBR	1,5	1,8	2,5	3	
OEL	EU	1,5	1,8	2,5	3	
TLV-ACGIH		0,4	0,5	1,6 (C)	2 (C)	SKIN

Predicted no-effect concentration - PNEC		
Normal value in fresh water	0,9	mg/l
Normal value in marine water	0,9	mg/l
Normal value of STP microorganisms	51	mg/l
Normal value for the terrestrial compartment	11	mg/kg/d

Health - Derived no-effect level - DNEL / DMEL

	Effects on consumers				Effects on workers			
Route of exposure	Acute local	Acute systemic	Chronic local	Chronic systemic	Acute local	Acute systemic	Chronic local	Chronic systemic
Oral	VND	0,01 mg/kg bw/d	VND	0,01 mg/kg bw/d				
Inhalation	1,25 mg/m3	0,03 mg/m3	0,2 mg/m3	0,03 mg/m3	2,5 mg/m3	2,5 mg/m3	1,5 mg/m3	1,5 mg/m3

Legend:
(C) = CEILING ; INHAL = Inhalable Fraction ; RESP = Respirable Fraction ; THORA = Thoracic Fraction.
VND = hazard identified but no DNEL/PNEC available ; NEA = no exposure expected ; NPI = no hazard identified ; LOW = low hazard ; MED = medium hazard ; HIGH = high hazard.

Biological indicators of exposure adopted; TLV ACGIH 2022
Fluorides in urine: 2 mg / l. Time of withdrawal: before the shift.
Fluorides in urine: 3 mg / l. Time of withdrawal: end of shift.

Recommended monitoring procedures
The methods for assessment of the atmosphere in the workplace must comply with the requirements stated in norms EN 482 and EN 689.

8.2. Exposure controls

As the use of adequate technical equipment must always take priority over personal protective equipment, make sure that the workplace

is well aired through effective local aspiration.
When choosing personal protective equipment, ask your chemical substance supplier for advice.
Personal protective equipment must be CE marked, showing that it complies with applicable standards.

Provide an emergency shower with face and eye wash station.

HAND PROTECTION
Gloves resistant to chemical agents and perfectly sealed, refer to UNI EN 374. Gloves must be inspected periodically and replaced in case of wear, perforation or contamination.
Keep in mind the information given by the manufacturer regarding permeability, penetration times, and conditions at the workplace (mechanical stress, contact duration).

Suitable materials
Natural rubber latex, butyl rubber, neoprene, Fluoroelastomer, with a protection index from chemical agents at least equal to 5 (permeation time > 240 minutes), recommended thickness of at least 0.35 mm.

SKIN PROTECTION
If the result of risk assessment is low, a complete barrier for the permeation of liquids is not necessary and when the personnel are able to take timely adequate actions if their clothes are contaminated (for example potential exposure to small amounts of light sprays, liquid aerosols or small volume of accidental spills), wear acid proof clothes (type 6) according to EN13034.
In case of processes where the risk of potential contact with the substance is not negligible, or situations where the operator can come into direct contact with the chemical (for example in case of lines and equipment opening, reclamation and entry in equipment) wear completely waterproof coverall with headgear compliant with standard EN14605 (type 3) (suggested class 6, permeation time > 480 min) and PVC / nitrile antacid boots.

EYE PROTECTION
Wear a hood visor or protective visor combined with airtight goggles (see standard EN 166).
In the presence of risks of exposure to splashes or squirts during work, adequate mouth, nose and eye protection should be used to prevent accidental absorption.

RESPIRATORY PROTECTION
Use a mask with a type B filter whose class (1, 2 or 3) must be chosen according to the limit of use concentration. (see standard EN 14387). In the presence of gases or vapours of various kinds and/or gases or vapours containing particulate (aerosol sprays, fumes, mists, etc.) combined filters are required (for example B2E2P3).
Respiratory protection devices must be used if the technical measures adopted are not suitable for restricting the worker's exposure to the threshold values considered. The protection provided by masks is in any case limited.
In case of confined space / insufficient oxygen / heavy fumes / (so face mask with filter does not offer adequate protection) and in the case of an emergency, wear open-circuit compressed air breathing apparatus (in compliance with standard EN 137) or external air-intake breathing apparatus (in compliance with standard EN 138). For a correct choice of respiratory protection device, see standard EN 529.

ENVIRONMENTAL EXPOSURE CONTROLS
The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value	Information
Appearance	Liquid	
Colour	Colourless	
Odour	Pungent	
Melting point / freezing point	-50 °C	
Initial boiling point	111 °C	
Flammability	Not flammable liquid	
Lower explosive limit	Not determined. The substance has no chemical groups associated with explosive properties [with certain materials (see section 10)]	

Upper explosive limit	Not determined. The substance has no chemical groups associated with explosive properties [with certain materials (see section 10)]	
Flash point	Not applicable (inorganic substance)	
Auto-ignition temperature	Not available	
Decomposition temperature	Not available	
pH	<1	In aqueous solution it is a weak acid
Kinematic viscosity	Not available	
Dynamic viscosity	1,33 mPa.s	Temperature: 0 °C
Solubility	Completely soluble in water	
Partition coefficient: n-octanol/water	The study was not conducted as the substance is inorganic (column 2 of REACH Annex VII, (section 7.8)	
Vapour pressure	9 mmHg (25 °C)	
Density and/or relative density	1,14 g/l (20°C)	
Relative vapour density	Not available	
Particle characteristics	Not applicable based on physical state	

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Corrosive to metals

Corrosive to metals	Hydrofluoric acid is corrosive to metals at concentrations higher than 0.5% (literature data)

9.2.2. Other safety characteristics

Information not available

SECTION 10. Stability and reactivity

10.1. Reactivity

Reacts violently with water.
Risk of explosion.
Risk of violent reaction

10.2. Chemical stability

The product is stable in normal conditions of use and storage. The anhydrous substance tends to polymerize.

10.3. Possibility of hazardous reactions

Corrosive in contact with metals. Releases hydrogen in reaction with metals.
Reacts violently with strong bases if concentrated or anhydrous, attacks silica and silicates, forms volatile corrosive substances in the presence of water.
Attacks many metals with evolution of hydrogen, an extremely flammable and explosive gas.

10.4. Conditions to avoid

Sun exposure and heating.

10.5. Incompatible materials

Water, steam, concrete, metals, glass and ceramics, oxidizing agents.

10.6. Hazardous decomposition products

Reacting with water and steam, produces toxic fumes. When heated to decomposition, it emits toxic fumes.
In contact with metals it produces hydrogen.

SECTION 11. Toxicological information

In the absence of experimental data for the product itself, health hazards are evaluated according to the properties of the substances it contains, using the criteria specified in the applicable regulation for classification.
It is therefore necessary to take into account the concentration of the individual hazardous substances indicated in section 3, to evaluate the toxicological effects of exposure to the product.

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

ACUTE TOXICITY

ATE (Inhalation - mists / powders) of the mixture:	0,13 mg/l
ATE (Inhalation - vapours) of the mixture:	1,25 mg/l
ATE (Inhalation - gas) of the mixture:	Acute Tox. 2
ATE (Oral) of the mixture:	12,50 mg/kg
ATE (Dermal) of the mixture:	12,50 mg/kg

HYDROFLUORIC ACID

STA (Oral):	5,001 mg/kg estimate from table 3.1.2 of Annex I of the CLP (figure used for calculation of the acute toxicity estimate of the mixture)
STA (Dermal):	5 mg/kg estimate from table 3.1.2 of Annex I of the CLP (figure used for calculation of the acute toxicity estimate of the mixture)
STA (Inhalation mists/powders):	0,051 mg/l estimate from table 3.1.2 of Annex I of the CLP (figure used for calculation of the acute toxicity estimate of the mixture)
STA (Inhalation vapours):	0,501 mg/l estimate from table 3.1.2 of Annex I of the CLP (figure used for calculation of the acute toxicity estimate of the mixture)

HYDROFLUORIC ACID
The substance is classified for oral acute toxicity Cat. 2 (Harmonised classification, CLP Reg., Annex VI)
The substance is classified as toxic by inhalation Cat. 2 (Harmonised classification, Reg. CLP, Annex VI)
The substance is classified as dermal acute toxicity Cat. 1 (Harmonised classification, CLP Reg., Annex VI).

SKIN CORROSION / IRRITATION
Corrosive for the skin
HYDROFLUORIC ACID
Method: OECD 404
Reliability (Klimisch score): 1
Species: White Rabbit (New Zealand)
Results: corrosive Cat. 1 (Harmonised classification, CLP Reg, Annex VI).

SERIOUS EYE DAMAGE / IRRITATION
Causes serious eye damage
HYDROFLUORIC ACID
Method: equivalent or similar to OECD 405
Reliability (Klimisch score): 2
Species: rabbit (albino)
Results: corrosive Cat. 1 (Harmonised classification, CLP Reg, Annex VI).

RESPIRATORY OR SKIN SENSITISATION
Does not meet the classification criteria for this hazard class

Respiratory sensitization
HYDROFLUORIC ACID
No data avaliable

Skin sensitization
HYDROFLUORIC ACID
No data avaliable

GERM CELL MUTAGENICITY
Does not meet the classification criteria for this hazard class
HYDROFLUORIC ACID
Method: equivalent or similar to OECD 471
Reliability (Klimisch score): 1
In vitro tests
Species: S. typhimurium TA 1535, TA 1537, TA 98 and TA 100
Results: negative with metabolic activation - negative without metabolic activation
Reference: Cytogenetic Studies of sodium fluoride in mice (Mutagenesis, 1994, 9(5), 467 (1994))
Reliability (Klimisch score): 2
Live testing
Species: mouse
Routes of exposure: oral
Results: negative.

CARCINOGENICITY
Does not meet the classification criteria for this hazard class
HYDROFLUORIC ACID
Reference: Two-year carcinogenicity study of sodium fluoride in rats (Journal of National Cancer Institute, 82(13): 1118-1126 (1990))
Reliability (Klimisch score): 2
Species: Rat (Sprague-Dawley Male/Female)
Routes of exposure: oral
NOEL results (carcinogenicity): 25 mg/kg body weight/day
LOEL results (toxicity): 10 mg/kg body weight/day
The substance is not classified for this hazard class.

REPRODUCTIVE TOXICITY
Does not meet the classification criteria for this hazard class

Adverse effects on development of the offspring
HYDROFLUORIC ACID
There are no studies on the effects of hydrofluoric acid on fertility.
Read across from Sodium Fluoride:
Fertility NOAEL Parent: 10 mg/kg
Fertility NOAEL F1: 10 mg/kg
Test substance, Sodium fluoride, drinking water, The product is not expected to have any effect on fertility.

Effects on or via lactation
HYDROFLUORIC ACID
No studies on hydrofluoric acid developmental toxicity and embryo-fetotoxicity are available.
However, a number of studies with the read-across NaF substance are available, including high-quality studies conducted by USP NTP and the FDA. There is no evidence for the developmental toxicity of fluoride.
Oral
Teratogenicity NOAEL:14mg/kg
Test substance, Sodium fluoride, potable water, The product is not expected to be toxic to development

STOT - SINGLE EXPOSURE
Does not meet the classification criteria for this hazard class

HYDROFLUORIC ACID
Based on available data, the substance does not show specific target organ toxicity effects for single exposure and is not classified under the relevant CLP hazard class.

STOT - REPEATED EXPOSURE
Does not meet the classification criteria for this hazard class
HYDROFLUORIC ACID
Based on available data, the substance does not show specific target organ toxicity effects for repeated exposure and is not classified under the relevant CLP hazard class.
Reference: Technical Report on the Toxicology and Carcinogenesis Studies of Sodium Fluoride in F344/N Rats and B6C3F1 Mice. (U.S Department of Health and Human Services. NTP TR 393, NIH Publication No. 91-2848, December 1990 (1990)), read across
Reliability (Klimisch score): 2
Species: Mouse (B6C3F1 Male/Female)
Routes of exposure: oral
NOEL results: 400ppm
Method: equivalent or similar to OECD 412
Reliability (Klimisch score): 1
Species: Rat (Fischer 344 Male/Female)
Routes of exposure: inhalation (gas)
NOAEL results: 1ppm
Repeated Exposure Toxicity (Dermal): Data not available.

ASPIRATION HAZARD
Does not meet the classification criteria for this hazard class

11.2. Information on other hazards
Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with human health effects under evaluation.

SECTION 12. Ecological information

Use this product according to good working practices. Avoid littering. Inform the competent authorities, should the product reach waterways or contaminate soil or vegetation.

12.1. Toxicity

HYDROFLUORIC ACID

LC50 - for Fish	51 mg/l/96h Oncorhynchus mykiss; European Union Risk Assessment Report, hydrogen fluoride. (2001)
EC50 - for Crustacea	153 mg/l/48h Daphnia magna; European Union Risk Assessment Report, hydrogen fluoride. (2001)

Toxicity to aquatic plants
Numerous short-term studies are summarized and reviewed in the EU RAR and the Dutch ICD. EC50 values for freshwater algae are reported to be between 43 and 122 mg/L (as fluoride ion, F-). For seaweed the EC50 is 81 mg/L in a single study with Skeletonema costatum. In long-term studies, NOEC values of 50 -249 mg/L and 50 -200 mg/L are reported for marine algae and freshwater algae, respectively.
EC50 - 96 h : 43 mg/l -
EC50 - 96 h : 122 mg/l - Algae
EC50 - 96 h : 81 mg/l - Algae
NOEC - 7 Days : 50 mg/l
NOEC - 8 Days : 249 mg/l
NOEC – 14 Days : 50-200 mg/l

Chronic NOEC for Fish	4 mg/l/21d Oncorhynchus mykiss; EU RAR Hydrogen Fluoride, Volume 8, 2001 (2001)
Chronic NOEC for Crustacea	The EU RAR summarizes the effects of two reproductive studies of sodium fluoride on Daphnia magna. The two studies report NOEC values of 3.7 and 14.1 mg/L, with an arithmetic mean of 8.9 mg/L

12.2. Persistence and degradability

The predominant mode of degradation of inorganic fluorides in the atmosphere is hydrolysis. The fluorides in the atmosphere can be present in gaseous form or as particulate matter and degrade mainly by hydrolysis. The fluorides emitted in the particulate matter to the atmosphere are generally stable and do not hydrolyse rapidly, although they can be degraded by radiation if they persist in the atmosphere.

12.3. Bioaccumulative potential

Fluorides have been shown to accumulate in some marine aquatic organisms. Fluorides mainly accumulate in the exoskeleton of crustaceans and in the bones of fish. BCF in freshwater fish is 53-58 (dry wt) or < 2 (wt/wt), in crustaceans < 1 (dry wt) or 3.2 (wt/wt). (EU RAR Hydrogen Fluoride, Volume 8, 2001).

12.4. Mobility in soil

The mobility of inorganic fluorides in the soil is influenced by the pH and by the formation of complexes, mainly of aluminum and calcium. The adsorption of fluorides to the solid phase of the soil is greater at slightly acidic pH values (5.5-6.5). Fluoride is not available in soil.
In water, the transport and transformation of inorganic fluorides are influenced by pH, water hardness and the presence of ion exchange materials such as clays. Once dissolved, these compounds, in conditions of low pH and water hardness values and in the presence of ion exchange materials, remain in solution. Soluble inorganic fluorides can form aerosols at the air-water interface or vaporize in the atmosphere, while undissolved species generally remain to settle.

12.5. Results of PBT and vPvB assessment

On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.

12.6. Endocrine disrupting properties

Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with environmental effects under evaluation.

12.7. Other adverse effects

Information not available

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Reuse, when possible. Product residues shall be considered special hazardous waste. The hazards of the wastes containing this product shall be evaluated according to applicable regulations. (Directive 2008/98/EC and subsequent amendments and supplements).
Disposal must be performed by an authorised waste management enterprise in compliance with national and local regulations.
The legal responsible for disposal is the producer / holder of the waste.
Different EWC codes could be applied to this mixture according to the European Waste Catalogue based on the specific circumstances that generated the waste, possible alterations and / or possible contamination.

The product as such, contained in the original packaging, or poured into in an appropriate recipient for disposal, or contained in a damaged packaging after an accidental leakage, shall be classified with a EWC code that is matching the description of the use shown at section 1.2.

The suitable final destination of the waste shall be evaluated by the producer on the basis of the chemical-physical characteristics of the waste, the compatibility with the authorized facility to which it will be provided for recovery, and the definitive treatment or disposal according to the procedures established by regulations in force.
Disposal through wastewater discharge is not permitted.

For hazardous substances registered according to Regulation EC 1907/2006 (REACH), for which a chemical safety report has been drawn up, refer to the specific information contained in the exposure scenarios attached to the Safety Data Sheets.

CONTAMINATED PACKAGING
Contaminated packaging, properly labeled, shall be sent to recovery or disposal in compliance with national waste management regulations and they shall be classified with the following EWC code: **15 01 10***: packaging containing residues of or contaminated by hazardous substances

SECTION 14. Transport information

14.1. UN number or ID number

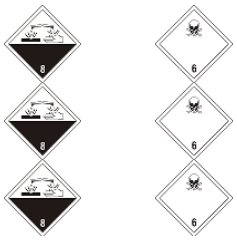
ADR / RID, IMDG, IATA: 1790

14.2. UN proper shipping name

ADR / RID: HYDROFLUORIC ACID
IMDG: HYDROFLUORIC ACID
IATA: HYDROFLUORIC ACID

14.3. Transport hazard class(es)

ADR / RID:	Class: 8	Label: 8 (6.1)
IMDG:	Class: 8	Label: 8 (6.1)
IATA:	Class: 8	Label: 8 (6.1)



14.4. Packing group

ADR / RID, IMDG, IATA: II

14.5. Environmental hazards

ADR / RID: NO
IMDG: NO
IATA: NO

14.6. Special precautions for user

ADR / RID:	HIN - Kemler: 86	Limited Quantities: 1 L	Tunnel restriction code: (E)
	Special provision: -		
IMDG:	EMS: F-A, S-B	Limited Quantities: 1 L	
IATA:	Cargo:	Maximum quantity: 30 L	Packaging instructions: 855
	Pass.:	Maximum quantity: 1 L	Packaging instructions: 851
	Special provision:	-	

14.7. Maritime transport in bulk according to IMO instruments

Information not relevant

SECTION 15. Regulatory information

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

Seveso Category - Directive 2012/18/EU: H1

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006

Product
Point 3

Contained substance

Point 75

Regulation (EU) 2019/1148 - on the marketing and use of explosives precursors

not applicable

Substances in Candidate List (Art. 59 REACH)

On the basis of available data, the product does not contain any SVHC in percentage ≥ than 0,1%.

Substances subject to authorisation (Annex XIV REACH)

None

Substances subject to exportation reporting pursuant to Regulation (EU) 649/2012:

None

Substances subject to the Rotterdam Convention:

None

Substances subject to the Stockholm Convention:

None

Dual use substance

The substance is included in Annex I of Regulation (EU) 2021/821, code 1C350 entry 24

Healthcare controls

Workers exposed to this chemical agent must not undergo health checks, provided that available risk-assessment data prove that the risks related to the workers' health and safety are modest and that the 98/24/EC directive is respected.

15.2. Chemical safety assessment

A chemical safety assessment has been performed for the following contained substances

HYDROFLUORIC ACID

SECTION 16. Other information

Text of hazard (H) indications mentioned in section 2-3 of the sheet:

Met. Corr. 1	Substance or mixture corrosive to metals, category 1

Acute Tox. 1/2	Acute toxicity, category 1/2
Acute Tox. 1	Acute toxicity, category 1
Acute Tox. 2	Acute toxicity, category 2
Skin Corr. 1A	Skin corrosion, category 1A
Eye Dam. 1	Serious eye damage, category 1
H290	May be corrosive to metals.
H300+H310+H330	Fatal if swallowed, in contact with skin or if inhaled.
H310	Fatal in contact with skin.
H300	Fatal if swallowed.
H330	Fatal if inhaled.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.

LEGEND:
- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- ATE: Acute Toxicity Estimate
- CAS: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE: Identifier in ESIS (European archive of existing substances)
- CLP: Regulation (EC) 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent bioaccumulative and toxic as REACH Regulation
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PNEC: Predicted no effect concentration
- REACH: Regulation (EC) 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA: Time-weighted average exposure limit
- TWA STEL: Short-term exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very Persistent and very Bioaccumulative as for REACH Regulation
- WGK: Water hazard classes (German).

GENERAL BIBLIOGRAPHY
1. Regulation (EC) 1907/2006 (REACH) of the European Parliament
2. Regulation (EC) 1272/2008 (CLP) of the European Parliament
3. Regulation (EU) 2020/878 (II Annex of REACH Regulation)
4. Regulation (EC) 790/2009 (I Atp. CLP) of the European Parliament
5. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
6. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
7. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
8. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
9. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament
10. Regulation (EU) 2015/1221 (VII Atp. CLP) of the European Parliament
11. Regulation (EU) 2016/918 (VIII Atp. CLP) of the European Parliament
12. Regulation (EU) 2016/1179 (IX Atp. CLP)
13. Regulation (EU) 2017/776 (X Atp. CLP)
14. Regulation (EU) 2018/669 (XI Atp. CLP)

15. Regulation (EU) 2019/521 (XII Atp. CLP)
16. Delegated Regulation (UE) 2018/1480 (XIII Atp. CLP)
17. Regulation (EU) 2019/1148
18. Delegated Regulation (UE) 2020/217 (XIV Atp. CLP)
19. Delegated Regulation (UE) 2020/1182 (XV Atp. CLP)
20. Delegated Regulation (UE) 2021/643 (XVI Atp. CLP)
21. Delegated Regulation (UE) 2021/849 (XVII Atp. CLP)
22. Delegated Regulation (UE) 2022/692 (XVIII Atp. CLP)

- The Merck Index. - 10th Edition
- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- IFA GESTIS website
- ECHA website
- Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

Note for the recipient of the Safety Data Sheet (SDS):

The recipient of this SDS shall make sure of reading and understanding the information included by all people who handle, store, use, or otherwise come into contact in any way with the substance or mixture to which this SDS is referred to. In particular, the recipient shall provide adequate training to the personnel for the use of hazardous substances and/or mixtures. The recipient shall verify the suitability and completeness of the provided information according to the specific use of the substance or mixture. However, the substance or mixture referred to by this SDS shall not be used for uses other than those specified in Section 1. The Supplier don't assume responsibility for improper uses. Since the use of the product does not fall under the direct control of the Supplier, the user shall, under his own responsibility, fulfill national and EU regulations concerning health and safety.
The information included in this SDS are provided in good faith and are based on the current state of scientific and technical knowledge, at the revision date indicated, available to the Supplier indicated in Section 1 of this SDS. It shall not be meant that the SDS is a guarantee of any specific property of the substance or mixture. The information concern only to the substance or mixture specifically designated in Section 1 and it could not be valid for the substance or mixture used in combination with other materials or in any process not specified in the text.
This version of the SDS substitutes all the previous versions.

Changes to previous review:
The following sections were modified:
01/ 02 / 03 / 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11 / 12 / 13 / 14 / 15 / 16.