

Hydrofluoric Acid 49%

Version number: 2.0

SECTION 1: Identification

1.1 Product identifier

Trade name Hydrofluoric Acid 49%

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

Relevant identified uses
Discharging agent
Cleaning agent
Semiconductors

Uses advised against
Do not use for squirting or spraying
Do not use for products which come into direct contact with the skin

1.3 Details of the supplier of the safety data sheet

Valudor Products, LLC
179 Calle Magdalena Suite 100
Encinitas, California CA 92024
United States

Telephone: +1 (760) 635 8500
e-mail: info@valudor.com
Website: www.valudor.com

1.4 Emergency telephone number

Emergency information 800-535-5053 (Infotrac)
As above or nearest toxicological information center.

SECTION 2: Hazard(s) identification

2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Classification				
Section	Hazard class	Category	Hazard class and category	Hazard statement
A.1O	acute toxicity (oral)	2	Acute Tox. 2	H300
A.1D	acute toxicity (dermal)	1	Acute Tox. 1	H310
A.1I	acute toxicity (inhal.)	2	Acute Tox. 2	H330
A.2	skin corrosion/irritation	1A	Skin Corr. 1A	H314
A.3	serious eye damage/eye irritation	1	Eye Dam. 1	H318
B.16	substance or mixture corrosive to metals	1	Met. Corr. 1	H290

For full text of abbreviations: see SECTION 16

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The most important adverse physicochemical, human health and environmental effects

Skin corrosion produces an irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis.

2.2 Label elements

Labelling acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Signal word danger

Pictograms

GHS05, GHS06



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 mist/vapors/spray.
P262	Do not get in eyes, on skin, or on clothing.
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	In case of inadequate ventilation wear respiratory protection.
P301+P330+P331+P310	If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a poison center/doctor.
P303+P361+P353+P310	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call a poison center/doctor.
P304+P340+P310	If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center/doctor.
P305+P351+P338+P310	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor.
P320	Specific treatment is urgent (see on this label).
P361+P364	Take off immediately all contaminated clothing and wash it before reuse.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container to an authorized waste treatment facility.

Hazardous ingredients for labelling hydrofluoric acid

2.3 Other hazards

Results of PBT and vPvB assessment

Does not contain a PBT-/vPvB-substance at a concentration of $\geq 0.1\%$.

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SECTION 3: Composition/information on ingredients

3.1 Substances

Not relevant (mixture).

3.2 Mixtures

Description of the mixture

Hazardous ingredients						
Name of substance	Identifier	Wt%	Classification acc. to GHS	Pictograms	Notes	Specific Conc. Limits
hydrofluoric acid	CAS No 7664-39-3 RTECS No MW7875000	25 – < 50	Acute Tox. 2 / H300 Acute Tox. 1 / H310 Acute Tox. 2 / H330 Skin Corr. 1A / H314 Eye Dam. 1 / H318		-	-

Remarks

For full text of H-phrases: see SECTION 16

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4: First-aid measures

4.1 Description of first-aid measures

General notes

Call a physician immediately.

Immediate effects can be expected after short-term exposure.

Self-protection of the first aider.

Take off immediately all contaminated clothing.

Remove affected person from the danger area and lay down.

Do not leave affected person unattended.

Following inhalation

Call a physician immediately.

Provide fresh air.

Mouth to mouth resuscitation should be avoided. Use alternative methods, preferably with oxygen or compressed air driven apparatus.

Following skin contact

After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water.

Rub with a gel containing calcium gluconate.

Call a physician immediately. Causes poorly healing wounds.

Following eye contact

Call a physician immediately.

Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart.

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Remove contact lenses, if present and easy to do. Continue rinsing.
Rinse copiously with a calcium gluconate solution.

Following ingestion

Do NOT induce vomiting.
Rinse mouth immediately and drink plenty of water.
Immediately give to drink plenty of water, add calcium (in the form of calcium gluconate or calcium lactate).
Call a physician immediately.

Notes for the doctor

Seek the advice of a specialist.

4.2 Most important symptoms and effects, both acute and delayed

Corrosivity.
Acute respiratory distress.
Risk of blindness.
Vomiting.
Cardiovascular system.
Circulatory collapse.
Pneumonia.
Pulmonary oedema.

4.3 Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

coordinate firefighting measures to the fire surroundings

Unsuitable extinguishing media

none

5.2 Special hazards arising from the substance or mixture

Non-combustible.
Hazardous decomposition products: Section 10.
May be corrosive to metals.

Hazardous combustion products

hydrogen fluoride (HF)

5.3 Advice for firefighters

Non-combustible.
Coordinate firefighting measures to the fire surroundings.
Keep containers cool with water spray.
In case of fire and/or explosion do not breathe fumes.
Do not allow firefighting water to enter drains or water courses.
Collect contaminated firefighting water separately.
Fight fire with normal precautions from a reasonable distance.

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Special protective equipment for firefighters

chemical protection suit, self-contained breathing apparatus (SCBA)

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Follow emergency procedures such as the need to evacuate the danger area or to consult an expert.

Wear respiratory protection.

Remove persons to safety.

Ventilate affected area.

Do not breathe mist/vapors/spray.

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

Wearing of suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing.

For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases.

6.2 Environmental precautions

Keep away from drains, surface and ground water.

Retain contaminated washing water and dispose of it.

If substance has entered a water course or sewer, inform the responsible authority.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Set up barriers.

Covering of drains.

Advice on how to clean up a spill

Collect spillage.

Absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust, etc.).

Appropriate containment techniques

Neutralization techniques.

Use of adsorbent materials.

Equipment required for containment/clean-up

material for neutralising like diluted soda or diluted caustic soda

Other information relating to spills and releases

Place in appropriate containers for disposal.

Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5.

Personal protective equipment: see section 8.

Incompatible materials: see section 10.

Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

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

Do not breathe vapor/spray.

Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation.

Handling of incompatible substances or mixtures

Do not mix with alkali.

Measures to protect the environment

Avoid release to the environment.

Do not empty into drains; dispose of this material and its container at hazardous or special waste collection point.

Advice on general occupational hygiene

Do not eat, drink and smoke in work areas.

Remove contaminated clothing and protective equipment before entering eating areas.

Do not breathe mist/vapors/spray.

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

Wash thoroughly after handling.

Preventive skin protection (barrier creams/ointments) is recommended.

7.2 Conditions for safe storage, including any incompatibilities

Corrosive conditions

Store in corrosive resistant container with a resistant inner liner.

Flammability hazards

None.

Incompatible substances or mixtures

Incompatible materials: see section 10.

Observe compatible storage of chemicals.

Protect against external exposure, such as

frost

Consideration of other advice

Keep away from food, drink and animal feedingstuffs.

Ventilation requirements

Keep any substance that emits harmful vapors or gases in a place that allows these to be permanently extracted.

Provision of sufficient ventilation.

Specific designs for storage rooms or vessels

Keep container tightly closed and in a well-ventilated place.

Store locked up.

Packaging compatibilities

Only packagings which are approved (e.g. acc. to ADR) may be used.

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Store in corrosive resistant container with a resistant inner liner.

7.3 Specific end use(s)

Discharging agent.

Cleaning agent.

Semiconductors.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

The following constituents are the only constituents of the product which have a PEL, a TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Occupational exposure limit values (Workplace Exposure Limits)									
Country	Name of agent	CAS No	Identifier	TWA [ppm]	TWA [mg/m ³]	STEL [ppm]	STEL [mg/m ³]	Notation	Source
US	hydrogen fluoride	7664-39-3	REL	3 (10 h)	2.5 (10 h)	-	-	-	NIOSH REL
US	hydrogen fluoride	7664-39-3	PEL	3	-	-	-	F	29 CFR 1910.1000
US	hydrogen fluoride	7664-39-3	TLV®	0.5	-	-	-	F, H	ACGIH® 2024
US	hydrogen fluoride (hydrofluoric acid)	7664-39-3	PEL (CA)	0.4	0.33	1	0.83	F, H	Cal/OSHA PEL

Notation

F calculated as F (fluorine)

H absorbed through the skin

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified)

8.2 Exposure controls

Appropriate engineering controls

Use local and general ventilation.

Individual protection measures (personal protective equipment)

Eye/face protection

Wear eye/face protection. Wear face-shield.

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Hand protection

Protective gloves		
Material	Material thickness	Breakthrough times of the glove material
CR: chloroprene (chlorobutadiene) rubber	≥ 0,5 mm	>120 minutes (permeation: level 4)
IIR: isobutene-isoprene (butyl) rubber	≥ 0,5 mm	>240 minutes (permeation: level 5)
FKM: fluoro-elastomer	≥ 0,4 mm	>480 minutes (permeation: level 6)

Wear suitable gloves.

Chemical protection gloves are suitable, which are tested according to EN 374.

Check leak-tightness/impermeability prior to use.

For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

Other protection measures

Chemical protection suit.

Acid-proof, acid-resistant boots or safety shoes.

Body protection

Protective clothing against liquid chemicals.

Respiratory protection

In case of inadequate ventilation wear respiratory protection.

Type : E (against acidic gases like sulfur dioxide or hydrogen chloride, color code: Yellow).

Type: E-P3 (combined filters against acidic gases and particles, colour code: Yellow/White) .

Environmental exposure controls

Use appropriate container to avoid environmental contamination.

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state	liquid
Color	colorless - clear
Odor	pungent
Odor threshold	not determined

Other safety parameters

pH (value)	~2 (20 °C), acid
Melting point/freezing point	-36 °C
Boiling point or initial boiling point and boiling	105 °C

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range

Flash point not determined

Evaporation rate not determined

Flammability (solid, gas) not relevant
(fluid)

Explosive limits not determined

Vapor pressure 36 hPa at 20 °C

Density and/or relative density

Density 1.17 g/cm³ at 20 °C

Relative density 1.27 (air = 1)

Relative vapour density this information is not available

Solubility(ies)

Water solubility not miscible in any proportion

Partition coefficient

n-octanol/water (log KOW) not relevant
(inorganic)

Auto-ignition temperature not determined

Decomposition temperature not relevant

Viscosity

Kinematic viscosity not determined

Dynamic viscosity not determined

Explosive properties none

Oxidizing properties none

Information for relevant hazard classes according to GHS

Corrosive to metals category 1: corrosive to metals

9.2 Other information there is no additional information

SECTION 10: Stability and reactivity

10.1 Reactivity

This material is not reactive under normal ambient conditions.
Substance or mixture corrosive to metals.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of tem-

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perature and pressure.
See below "Conditions to avoid".

10.3 Possibility of hazardous reactions

Metals (due to the release of hydrogen in an acid/alkaline medium).
Vigorous reactions with:
Alkali hydroxide (caustic alkali).
Alkali metal.
Phosphorus oxides (PxOy).
Permanganates, e.g. potassium permanganate.

10.4 Conditions to avoid

Heat.

10.5 Incompatible materials

alkalines, glass, metals, methanesulfonic acid, oxidizers

10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.
Hydrogen fluoride (HF).
Hydrogen.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Classification procedure

If not otherwise specified the classification is based on:
Ingredients of the mixture (additivity formula).

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Acute toxicity

Fatal if swallowed.
Fatal in contact with skin.
Fatal if inhaled.

Acute toxicity estimate (ATE)

Oral 10.2 mg/kg
Dermal 10.2 mg/kg
Inhalation: vapor 1.02 mg/l/4h

Acute toxicity of components

Acute toxicity estimate (ATE) of components			
Name of substance	CAS No	Exposure route	ATE
hydrofluoric acid	7664-39-3	oral	5 mg/kg
hydrofluoric acid	7664-39-3	dermal	5 mg/kg
hydrofluoric acid	7664-39-3	inhalation: vapor	0.5 mg/l/4h

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Skin corrosion/irritation

Causes severe burns.

Serious eye damage/eye irritation

Causes serious eye damage.

Respiratory or skin sensitization

Skin sensitization

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Respiratory sensitization

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Germ cell mutagenicity

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Carcinogenicity

IARC Monographs

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans			
Name of substance	CAS No	Classification	Number
hydrofluoric acid		3	-

Legend

3 Not classifiable as to carcinogenicity in humans

National Toxicology Program (United States)

None of the ingredients are listed.

OSHA Carcinogens

None of the ingredients are listed.

Reproductive toxicity

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Specific target organ toxicity - single exposure

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Specific target organ toxicity - repeated exposure

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics

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If swallowed:

corrosivity, severe abdominal pain, vomiting

If in eyes:

causes severe burns, risk of blindness

If inhaled:

cough, pain, choking, and breathing difficulties, causes severe burns, pneumonia, pulmonary oedema

If on skin:

risk of absorption via the skin, skin corrosion produces an irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis

11.2 Other information

There is no additional information.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity (acute)

Based on available data, the classification criteria are not met.

Aquatic toxicity (acute) of components

Name of substance	CAS No	Endpoint	Exposure time	Value	Species	Method	Source
hydrofluoric acid	7664-39-3	EC50	96 h	26 – 48 mg/l	trichoptera aquatic larvae	-	ECHA
hydrofluoric acid	7664-39-3	EbC50	96 h	43 mg/l	algae	-	ECHA

Aquatic toxicity (chronic)

Based on available data, the classification criteria are not met.

Aquatic toxicity (chronic) of components

Name of substance	CAS No	Endpoint	Exposure time	Value	Species	Method	Source
hydrofluoric acid	7664-39-3	EC50	3 h	2,930 mg/l	Bacteria (activated sludge)	DIN EN ISO 8192	ECHA
hydrofluoric acid	7664-39-3	NOEC	21 d	4 mg/l	rainbow trout (Oncorhynchus mykiss)	-	ECHA
hydrofluoric acid	7664-39-3	NOEC	21 d	3.7 mg/l	daphnia magna	-	ECHA
hydrofluoric acid	7664-39-3	NOEC	7 d	50 mg/l	algae	-	ECHA

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Name of substance	CAS No	Endpoint	Exposure time	Value	Species	Method	Source
hydrofluoric acid	7664-39-3	growth (Eb-Cx) 10%	3 h	1,127 mg/l	Bacteria (activated sludge)	DIN EN ISO 8192	ECHA

12.2 Persistence and degradability

Biodegradation

Data are not available.

Persistence

No data available.

12.3 Bioaccumulative potential

n-octanol/water (log KOW)

not relevant
(inorganic)

Bioaccumulative potential of components

Name of substance	CAS No	BCF	Log KOW
hydrofluoric acid	7664-39-3	53 – 58	0.1

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

Does not contain a PBT-/vPvB-substance at a concentration of $\geq 0.1\%$.

12.6 Other adverse effects

Data are not available.

Harmful effect on fish, plankton and other organisms due to pH shift possible.

Remarks

Wassergefährdungsklasse, WGK (water hazard class): 2 Keep away from drains, surface and ground water.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packages

Completely emptied packages can be recycled.

Handle contaminated packages in the same way as the substance itself.

Remarks

Please consider the relevant national or regional provisions.

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SECTION 14: Transport information

14.1 UN number

DOT	UN1790
IMDG-Code	UN1790
ICAO-TI	UN1790

14.2 UN proper shipping name

DOT	Hydrofluoric acid
IMDG-Code	HYDROFLUORIC ACID
ICAO-TI	Hydrofluoric acid

14.3 Transport hazard class(es)

DOT	8 (6.1)
IMDG-Code	8 (6.1)
ICAO-TI	8 (6.1)

14.4 Packing group

DOT	II
IMDG-Code	II
ICAO-TI	II

14.5 Environmental hazards

-

14.6 Special precautions for user

-

14.7 Transport in bulk according to IMO instruments

-

14.8 Information for each of the UN Model Regulations

Transport of dangerous goods by road or rail (49 CFR US DOT) Additional information

Particulars in the shipper's declaration UN1790, Hydrofluoric acid, 8 (6.1), II

Reportable quantity (RQ) 204.1 lbs
(92.65 kg)
(hydrofluoric acid)

Danger label(s) 8+6.1



Special provisions (SP) A7, B15, IB2, N5, N34, T8, TP2

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ERG No 157

International Maritime Dangerous Goods Code (IMDG) Additional information

Marine pollutant -
Danger label(s) 8+6.1



Excepted quantities (EQ) E2
Limited quantities (LQ) 1 L
EmS F-A, S-B
Stowage category D
Segregation group 1 - Acids.

International Civil Aviation Organization (ICAO-IATA/DGR) Additional information

Danger label(s) 8+6.1



Excepted quantities (EQ) E2
Limited quantities (LQ) 0,5 L

SECTION 15: Regulatory information

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

National regulations (United States)

Toxic Substance Control Act (TSCA) All ingredients are listed (ACTIVE) or exempt from listing

Superfund Amendment and Reauthorization Act (SARA TITLE III)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

The List of Extremely Hazardous Substances and Their Threshold Planning Quantities					
Name of substance	Name acc. to inventory	CAS No	Notes	Reportable quantity (pounds)	Threshold planning quantity (pounds)
hydrofluoric acid	hydrogen fluoride	7664-39-3	-	100	100

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Specific Toxic Chemical Listings (EPCRA Section 313)

Toxics Release Inventory: Specific Toxic Chemical Listings				
Name of substance	Name acc. to inventory	CAS No	Remarks	Effective date
hydrofluoric acid	hydrogen fluoride	7664-39-3	-	1987-01-01

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

Name of substance	Name acc. to inventory	CAS No	Re- marks	Stat- utory code	Final RQ pounds (Kg)
hydrofluoric acid	Hydrofluoric acid; Hydrogen fluoride	7664-39-3	-	1 3 4	100 (45,4)

Legend

- 1 "1" indicates that the statutory source is section 311(b)(2) of the Clean Water Act
- 3 "3" indicates that the source is section 112 of the Clean Air Act
- 4 "4" indicates that the source is section 3001 of the Resource Conservation and Recovery Act (RCRA)

Clean Air Act

Name of substance	Name acc. to inventory	CAS No	Type of registra- tion	Basis for listing	Threshold quantity (lbs)
hydrofluoric acid	hydrogen fluoride (hydro- fluoric acid)	7664-39-3	Toxic sub- stance	a b	1000

Legend

- a Mandated for listing by Congress.
- b On EHS list, vapor pressure 10 mmHg or greater.

Right to Know Hazardous Substance List

Toxic or Hazardous Substance List (MA-TURA)

Name of substance	Name acc. to inventory	CAS No	DEP CODE	PBT / HHS / LHS	PBT / HHS Thres hold	De Minimis Concentra- tion Threshold
hydrofluoric acid	Hydrofluoric acid (all concen- trations)	7664-39-3	-	HHS	1000 LBS	1.0 %

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Hazardous Substances List (MN-ERTK)

Name of substance	Name acc. to inventory	CAS No	References	Remarks
hydrofluoric acid	Fluoride, as F	16984-48-8	A, N, O	dust
hydrofluoric acid	Hydrogen fluoride, as F	7664-39-3	A, N, O	-

Legend

- A American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1992-93", available from ACGIH
- dust If the substance poses an airborne particulate exposure hazard, the substance is followed by the word "dust."
- N National Institute for Occupational Safety and Health (NIOSH), "Recommendations for Occupational Safety and Health Standards," August 1988, available from NIOSH, Publications Dissemination Office, Division of Standards Development and Technology Transfer
- O Occupational Safety and Health Administration (OSHA), Safety and Health Standards, Code of Federal Regulations, title 29, part 1910, subpart Z, "Toxic and Hazardous Substances, 1990." General information: Minnesota Department of Labor and Industry, Occupational Safety and Health Division

Hazardous Substance List (NJ-RTK)

Name of substance	Name acc. to inventory	CAS No	Remarks	Classifications	Listed in	Substance number	DOT number
hydrofluoric acid	hydrogen fluoride (hydrofluoric acid) (hydrofluoric acid)	7664-39-3	-	CO R1.	1 2 3 4 6 7 15 17 18 19 20 21 22	3759	1052

Legend

- 1 Occupational Safety and Health Administration, 29 CFR 1910-Occupational Safety and Health Standards, Subpart Z-Toxic and Hazardous Substances, July 1, 2008.
- 15 "Fire Protection Guide to Hazardous Materials," NFPA 49 (Hazardous Chemicals Data), NFPA 325 (Guide to Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids), and NFPA 704 (Standard System for the Identification of the Hazards of Materials for Emergency Response), National Fire Protection Association (NFPA), 2001.
- 17 "2008 Emergency Response Guidebook," Research and Special Programs Administration, U.S. Department of Transportation, 2008.
- 18 List of Toxic Release Inventory Chemicals, Section 313, Emergency Planning and Community Right to Know Act (EPCRA), Toxic Release Inventory (TRI) Program, U.S. Environmental Protection Agency, 40 CFR 372.65, July 1, 2008.

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Legend

- 19 List of Extremely Hazardous Substances and Their Threshold Planning Quantities (TPQ), Section 302, Emergency Planning and Community Right to Know Act (EPCRA), U.S. Environmental Protection Agency, 40 CFR 355-Emergency Planning and Notification, Appendix A, July 1, 2008.
- 2 "2009 TLVs® and BEIs®, Threshold Limit Values and Biological Exposure Indices," American Conference of Governmental Industrial Hygienists (ACGIH), 2009.
- 20 List of Hazardous Substances and Reportable Quantities (RQ), Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), U.S. Environmental Protection Agency, 40 CFR 302, Table 302.4, July 1, 2008.
- 21 21. Hazardous Wastes from the P and U Lists, Resource Conservation and Recovery Act (RCRA), U.S. Environmental Protection Agency, 40 CFR 261.33, July 1, 2008.
- 22 List of Regulated Toxic Substances and Threshold Quantities for Accidental Release Prevention (Table 1) and List of Regulated Flammable Substances and Threshold Quantities for Accidental Release Prevention (Table 3), Section 112(r), Federal Clean Air Act Amendments, U.S. Environmental Protection Agency, 40 CFR 68.130, Tables 1 and 3, July 1, 2008.
- 3 Office of Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 49 CFR 172.101-Hazardous Materials Table, October 1, 2008.
- 4 "NIOSH Pocket Guide to Chemical Hazards," National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, No. 2005-149, September 2005.
- 6 "Environmental Hazardous Substance List," New Jersey Department of Environmental Protection, N.J.A.C. 7:1G-2, as printed in the Community Right to Know Survey Instruction Book, 2008.
- 7 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, "All Supplements, All Volumes, Groups 1, 2A, 2B, and 3, International Agency for Research on Cancer (IARC), World Health Organization, 2008.
- CO Corrosive
- R1 Reactive - First Degree

Hazardous Substance List (Chapter 323) (PA-RTK)

Name acc. to inventory	CAS No	Classification
HYDROFLUORIC ACID	7664-39-3	E

Legend

- E Environmental hazard

Hazardous Substance List (RI-RTK)

Name of substance	Name acc. to inventory	CAS No	References
hydrofluoric acid	Hydrofluoric acid	7664-39-3	T, F
hydrofluoric acid	Hydrogen fluoride (as F)	7664-39-3	T, F

Legend

- F Flammability (NFPA®)
- T Toxicity (ACGIH®)

California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

None of the ingredients are listed

Drug precursors, Chemicals designated within the Controlled Substances Act, 21 U.S.C. §

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802, paragraphs 34 (list I) and 35 (list II)

None of the ingredients are listed

SECTION 16: Other information, including date of preparation or last revision

Date of preparation: 2022-11-07

Date of last revision: 2025-07-18.

Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
29 CFR 1910.1000	29 CFR 1910.1000, Tables Z-1, Z-2, Z-3 - Occupational Safety and Health Standards: Toxic and Hazardous Substances (permissible exposure limits)
49 CFR US DOT	49 CFR U.S. Department of Transportation
ACGIH®	American Conference of Governmental Industrial Hygienists
ACGIH® 2024	From ACGIH®, 2024 TLVs® and BEIs® Book. Copyright 2024. Reprinted with permission. Information on the proper use of the TLVs® and BEIs®: http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement
Acute Tox.	Acute toxicity
ADR	Accord relatif au transport international des marchandises dangereuses par route (Agreement concerning the International Carriage of Dangerous Goods by Road)
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
Cal/OSHA PEL	California Division of Occupational Safety and Health (Cal/OSHA): Permissible Exposure Limits (PELs)
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DEP CODE	Department of Environmental Protection Code
DGR	Dangerous Goods Regulations (see IATA/DGR)
DOT	Department of Transportation (USA)
EbC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
EmS	Emergency Schedule
ERG No	Emergency Response Guidebook - Number
Eye Dam.	Seriously damaging to the eye
Eye Irrit.	Irritant to the eye
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
HHS	Higher hazard substance
IARC	International Agency for Research on Cancer
IARC Mono-	IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

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Abbr.	Descriptions of used abbreviations
graphs	
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
ICAO	International Civil Aviation Organization
ICAO-TI	Technical instructions for the safe transport of dangerous goods by air
IMDG	International Maritime Dangerous Goods Code
IMDG-Code	International Maritime Dangerous Goods Code
LHS	Lower hazard substance
log KOW	n-Octanol/water
NFPA®	National Fire Protection Association (United States)
NIOSH REL	National Institute for Occupational Safety and Health (NIOSH): Recommended Exposure Limits (RELs)
NOEC	No Observed Effect Concentration
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
PEL	Permissible exposure limit
ppm	Parts per million
RTECS	Registry of Toxic Effects of Chemical Substances (database of NIOSH with toxicological information)
Skin Corr.	Corrosive to skin
Skin Irrit.	Irritant to skin
STEL	Short-term exposure limit
TLV®	Threshold Limit Values
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

Key literature references and sources for data

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200 (May 20, 2024 eff. July 19, 2024).

Transport of dangerous goods by road or rail (49 CFR US DOT).

International Maritime Dangerous Goods Code (IMDG).

Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties.

Health hazards.

Environmental hazards.

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

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List of relevant phrases (code and full text as stated in section 2 and 3)

Code	Text
H290	May be corrosive to metals.
H300	Fatal if swallowed.
H310	Fatal in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H330	Fatal if inhaled.

Responsible for the safety data sheet

Chemical Regulatory Compliance Com- Telephone: +1 (630) 410-1660
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Jasper, GA Website: www.crc-us.com
USA

Disclaimer

This information is based upon the present state of our knowledge.
This SDS has been compiled and is solely intended for this product.