

Hydrogen fluoride

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

1.1. Product identifier

Name of product	Hydrogen fluoride Art-Nr(n): 3100
Name of substance	Hydrogen fluoride
Index No	009-002-00-6
EC No	231-634-8
REACH registration number	01-2119458860-33
CAS No	7664-39-3

Manufacturer / Distributor:

Ehsan International Gases

40/9, Aurangabad, Nazimabad
#3, Karachi 74600, Pakistan.
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www.ehsan.com.pk

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

Identified uses

! Product categories [PC]

- PC15 - Non-metal-surface treatment products
- PC21 - Laboratory chemicals
- PC35 - Washing and cleaning products (including solvent based products)

! Process categories [PROC]

- PROC1 - Use in closed process, no likelihood of exposure
- PROC2 - Use in closed, continuous process with occasional controlled exposure
- PROC3 - Use in closed batch process (synthesis or formulation)
- PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
- PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
- PROC7 - Industrial spraying
- PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities
- PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
- PROC13 - Treatment of articles by dipping and pouring
- PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
- PROC15 - Use as laboratory reagent
- PROC19 - Hand-mixing with intimate contact and only PPE available

! Environmental release categories [ERC]

- ERC7 - Industrial use of substances in closed systems
- ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8b - Wide dispersive indoor use of reactive substances in open systems
- ERC2 - Formulation of preparations (mixtures)

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ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
 ERC5 - Industrial use resulting in inclusion into or onto a matrix
 ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b
 - Industrial use of reactive processing aids

! Recommended intended purpose(s)

Basic substance.
 Catalyst.
 Intermediate.
 Laboratory reagent.
 Etchant.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to 67/548/EEC or 1999/45/EC

T+; R26/27/28

C; R35 R-

phrases

26/27/28

Very toxic by inhalation, in contact with skin and if swallowed.

35

Causes severe burns.

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard classes and Hazard categories	Hazard Statements	Classification procedure	Hazard statements for health hazards
Acute Tox. 1	H310		
Acute Tox. 2	H300		
Acute Tox. 2	H330		
Skin Corr. 1A	H314		

2.2. Label elements Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]



GHS05



GHS06

Signal word

Danger

Hazard statements for health hazards

H300 + H310 + H314 Fatal if swallowed, in contact with skin or if inhaled. H330 Causes severe skin burns and eye damage.

Precautionary Statements

Prevention

P260 Do not breathe gas/vapours.
 P262 Do not get in eyes, on skin, or on clothing.

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P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

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

P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

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

P315 Get immediate medical advice/attention.

Storage

P403 Store in a well-ventilated place.

P405 Store locked up.

Supplemental Hazard information (EU)

Health properties

Corrosive to the respiratory tract.

2.3. Other hazards

Information pertaining to special dangers for human and environment

Dangerous substances are released in case of decomposition.

Receptacle under pressure. Heating causes rise in pressure with risk of bursting of the pressure receptacle.

SECTION 3: Composition/ information on ingredients

3.1. Substances

CAS No 7664-39-3

Hydrogen fluoride

EC No 231-634-8

Index No 009-002-00-6

REACH registration number 01-2119458860-33

3.2. Mixtures

not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Remove contaminated soaked clothing immediately.

Adhere to personal protective measures when giving first aid.

Seek medical treatment immediately.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.

In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registered trademarks).

Seek medical treatment immediately.

In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

In case of skin contact

In case of contact with skin wash off immediately with soap and water.

Immediate medical treatment necessary, as untreated burns can result in slow-healing wounds.

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In case of skin contact, wearing rubber gloves rub 2.5% calcium gluconate gel continuously into the affected area for 1.5 hours or until further medical care is available.

In case of eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call for a doctor immediately.

In case of ingestion

Do not induce vomiting.

Call for a doctor immediately.

Rinse out mouth and give plenty of water to drink.

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

Physician's information / possible symptoms

Shortness of breath Shortness of breath.

Physician's information / possible dangers Risk of pulmonary oedema

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

Treatment (Advice to doctor)

Continue to monitor for pneumonia and pulmonary oedema.

Monitor circulation.

Symptoms may not occur until several hours.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Product does not burn, fire-extinguishing activities according to surrounding.

Unsuitable extinguishing media

Full water jet

5.2. Special hazards arising from the substance or mixture

In the event of fire the following can be released: Hydrogen.

5.3. Advice for firefighters

Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply (isolated). Wear full protective clothing.

Additional information

Cool endangered containers with water spray jet.

Exposure to fire may cause containers to rupture / explode.

Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations. Collect contaminated firefighting water separately, must not be discharged into the drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See chapter 8.

Remove persons to safety.

Evacuate area.

Keep people away and stay on the upwind side.

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6.2. Environmental precautions

Do not discharge into the drains or bodies of water..

Collect contaminated water / firefighting water separately.

If possible, stop flow of product.

Prevent spread over a wide area (e.g. by containment or oil barriers).

If necessary, secure leaky pressure receptacles in a salvage packaging.

Suppress gases/vapours/mists with water spray jet Do not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up Ensure adequate air ventilation.

Take up with absorbent material (e.g. sand, kieselguhr, acid binder, general-purpose binder, sawdust).

Clean contaminated objects and floor thoroughly under consideration of environment regulations. After taking up the material dispose according to regulation.

Additional Information No water on the leaks.

6.4. Reference to other sections

Safe handling: see section 7

Personal protection equipment: see section 8

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Use only in thoroughly ventilated areas.

Transfer and handle only in enclosed systems.

The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.

Prevent cylinders from falling over.

Ensure valve outlet cap nut or plug is correctly fitted.

Ensure valve protection device is correctly fitted.

Open valve slowly to avoid pressure shock.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.

Do not allow backfeed into the container.

Suck back of water into the container must be prevented.

No water to valves, flanges and other fittings.

Purging of pipes and valves with inert gases - to avoid: water, solvents.

General protective measures Do not inhale vapours.

Hygiene measures

At work do not eat, drink, smoke or take drugs. Wash hands before breaks and after work.

Advice on protection against fire and explosion The product is not combustible.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels Ventilate store-rooms thoroughly.

Do not use glass containers.

Do not use ceramic containers.

Use transportable pressure equipment.

Suitable materials: Normalised steel and carbon steel, tempered steel, stainless steel.

Valve: Suitable materials: Carbon steels, stainless steel.

Unsuitable materials: Aluminium alloys, brass, copper alloys.

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Advice on storage compatibility Do not store with alkalis.
Do not store with combustible materials.

Do not store with spontaneously flammable materials.
Do not store together with animal feedstuffs.
Do not store together with explosives.
Do not store together with infectious substances.
Do not store together with radioactive material.
Do not store together with food.
Do not store together with oxidizing agents.

Further information on storage conditions

Ensure valve protection device is correctly fitted.
Store closed container at cool and aired place.
Store only in original container at temperature of 50°C maximum (=122°F). Prevent cylinders from falling over.

7.3. Specific end use(s)

! Recommendation(s) for intended use See exposure scenario(s).

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
7664-39-3	Hydrogen fluoride	WEL, 8 hours	1,5	1,8	UK (EH40 / 2005)
		Short-term	2,5	3	
7664-39-3	Hydrogen fluoride	TWA, 8 hours	2,5	3	USA (NIOSH)
		Short-term	5	6	
7664-39-3	Hydrogen fluoride	PEL, 8 hours		3	USA (OSHA, table Z-2)

Indicative occupational exposure limit values (91/322/EEC, 2000/39/EC, 2006/15/EC or 2009/161/EU)

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
7664-39-3	Hydrogen fluoride	8 hours	1,5	1,8	Short-term 2,5 3

! Additional advice

DNEL (workers, inhalation, long-term, local effects): 1,5 µg/m³ DNEL
(workers, inhalation, short-term, systemic effects): 2,5 mg/m³.
DNEL (workers, inhalation, long-term, systemic effects): 1,5 mg/m³.
DNEL (workers, inhalation, short-term, local effects): 2,5 mg/m³.
DNEL (consumers, inhalation, short-term and long-term, systemic effects): 0,03 mg/m³.
DNEL (consumers, inhalation, long-term, local effects): 0,2 mg/m³.
DNEL (consumers, inhalation, short-term, local effects): 1,25 mg/m³.
DNEL (consumer, ingestion, short-term and long-term, systemic effects): 0,01 mg/kg.

8.2. Exposure controls

Respiratory protection

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Short term: filter apparatus, combination filter E-P2
Breathing apparatus in the event of high concentrations.

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Keep self contained breathing apparatus readily available for emergency use. Short term: filter apparatus, combination filter B-P2

Hand protection chemical-resistant gloves

Glove material specification [make/type, thickness, permeation time/life]: FKM, >= 0,7 mm, > 480 min

Eye protection

Safety goggles, in case of increased risk add protective face shield

Skin protection

Safety shoes with steel toe.

Body covering work clothing, or chemical resistant suit at increased risk.

! Limitation and surveillance of the environment

PNEC (freshwater): 0,9 mg/l

PNEC (marine water): 0,9 mg/l

PNEC (sewage treatment plant): 51 mg/l

PNEC (soil): 11 mg/kg dw

PNEC (freshwater sediment): 0,766 mg/kg

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form

compressed liquified gas

Colour

colourless

Odour

pungent

Odour threshold

0,033 - 0,133 mg/m³

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value in delivery state	< 1	20 °C	10 %		aqueous solution
Acid number	not applicable				
boiling point	19,5 °C		1013 hPa		
melting point	-83,4 °C				
Flash point	no				
Flammability (gas)	no				
Ignition temperature	no				
Autoignition	no				
Lower explosion limit	no				
Upper explosion limit	no				

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	Value	Temperature	at	Method	Remark
Vapour pressure	1031 hPa	20 °C			
Relative density	0,967 g/cm3	20 °C			information concerns to liquid phase
Vapour density	0,71				air = 1
Solubility in water					multimiscible
Partition coefficient (log pOW)	-1,4				
Viscosity dynamic	0,214 mPa*s	20 °C			information concerns to liquid phase
Solvent concentration	not applicable				

Oxidising properties
no

Explosive properties
no

9.2. Other information

Product effects hygroscopic.
Vapours are less heavy than air.

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SECTION 10: Stability and reactivity

10.1. Reactivity

See section "Possibility of hazardous reactions".

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reactions with numerous chemical compounds.

Reactions with acids.

Reactions with organic substances.

Reactions with water.

Reactions with metals, with evolution of hydrogen.

Reactions with alkalies.

10.4. Conditions to avoid

Heat sources / heat - risk of bursting.

Humidity.

10.5. Incompatible materials

Materials to avoid

Ammonia

Phosphorus oxides (e.g. P₂O₅)

Powdered metals

nitric acid

sulphuric acid and sulphurous acid

Organic substances (fats, oils).

Water / moisture.

Glass and silicate-containing materials are attacked. Alkalies.

10.6. Hazardous decomposition products

Hydrogen

Additional information

Risk of hydrogen embrittlement.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity/Irritability/Sensitization

	Value/Validation	Species	Method	Remark
LD50 acute oral	Study scientifically not justified.			
LD50 acute dermal	Study scientifically not justified.			
LC50 acute inhalation	2240 - 2340 ppm (1 h)	Rat (male)	OECD 403	
Irritability skin	corrosive	rabbit	OECD 404	Aqueous solution.

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Irritability eye	corrosive	rabbit eye	OECD 405	Aqueous solution.
Skin sensitization	Study scientifically not justified.			
Sensitization respiratory system	not determined			

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Subacute Toxicity	NOAEL 1 ppm (70 d) Sub-acute inhalation toxicity 6 h/d, 5 d/w	rat (male / female)	OECD 412	
Subchronic Toxicity	NOAEL 0,88 ppm (90 d) Inhalation 6 h/d, 5 d/w	Rat (male / female)	OECD 413	Systemic toxicity
Mutagenicity				No experimental information on genotoxicity in vitro and in vivo available.
Reproduction-Toxicity	NOAEL 250 ppm Oral Drinking water	Rat (male / female)	OECD 416	

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	Value	Species	Method	Validation
Carcinogenicity	NOAEL 175 ppm (2 a) Oral. Drinking water	Rat		

! Specific target organ toxicity (single exposure)

Inhalation, various species: no effect observed.

! Specific target organ toxicity (repeated exposure)

NOAEL (rats, inhalation): 0.72 mg/m³ (0.88 ppm) - Target organs: respiratory system, bones, teeth, kidneys, liver.

! Aspiration hazard

No data available

! Experiences made from practice

Risk of strong health injuries in case of long-term exposition.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicological effects

	Value	Species	Method	Validation
Fish	LC50 51 - 340 mg/l (96 h)	freshwater fish		Fluoride.
Daphnia	EC50 26 - 48 mg/l (48 h)	Benthic larvae (Chimarra marginata, Hydropsyche lobata, Hydropsyche bulbifera, Hydropsyche exocellata and Hydropsyche pellucidula)		Fluoride.
Algae	EC50 43 - 122 mg/l (96 h)	Algae		Fluoride.
Bacteria	NOEC 510 mg/l (3 h)	activated sludge	OECD 209	

12.2. Persistence and degradability

Physico-chemical

not determined

Biological degradability

Inorganic product, cannot be eliminated from the water by biological purification processes.

Biological eliminability

Inorganic product, cannot be eliminated from the water by biological purification processes.

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12.3. Bioaccumulative potential

Does not bioaccumulate.

12.4. Mobility in soil

Fluoride is not readily leached from soils.

12.5. Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

Not known.

Additional ecological information

	Value	Method	Remark
COD	not applicable		
BOD	not applicable		

General regulation

Do not allow uncontrolled leakage of product into the environment.

Product is not allowed to be discharged into the ground water or aquatic environment.

Product is not allowed to be discharged into aquatic environment, drains or sewage treatment plants.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste code No.

06 01 03*

16 05 04*

Name of waste

hydrofluoric acid

gases in pressure containers (including halons) containing dangerous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 91/689/EEC on hazardous waste.

Recommendations for the product

Dispose of as hazardous waste.

Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

SECTION 14: Transport information

Land and inland navigation transport ADR/RID

UN 1052 HYDROGEN FLUORIDE, ANHYDROUS, 8 (6.1), I, (C/D), Classification code: CT1

Marine transport IMDG

UN 1052 HYDROGEN FLUORIDE, ANHYDROUS, 8 (6.1), I

Air transport ICAO/IATA-DGR

UN 1052 Hydrogen fluoride, anhydrous, 8 (6.1)

FORBIDDEN

Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

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

not applicable

No transport as bulk according IBC - Code.

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SECTION 15: Regulatory information

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

Other regulations (EU)

Verordnung (EG) Nr. 1907/2006 zur Registrierung, Bewertung, Zulassung und Beschränkung chemischer Stoffe (REACH), Anhang XVII Nr. 3.

Directive 96/82/EC on the control of major-accident hazards involving dangerous substances.

15.2. Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

Exposure scenarios (ESs) see http://www.ghc.de/pdf_e/es3100.001e.pdf.

SECTION 16: Other information

Recommended uses and restrictions

National and local regulations concerning chemicals shall be observed.

Further information

All declarations of safety-data-sheet refer to pure substance.

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product. Indication of changes: "!" = Data changed compared with the previous version.

Wording of the R/H-phrases specified in chapter 3 (not the classification of the mixture!)

R 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.

R 35 Causes severe burns.

H300 Fatal if swallowed.

H310 Fatal in contact with skin.

H314 Causes severe skin burns and eye damage.

H330 Fatal if inhaled.