

# CEFIC CTEF

**S.T.S. 79/30**

Revised April 1997

## CHEMICAL SAFETY DATA SHEET

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### 1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY

PRODUCT NAME: HYDROGEN FLUORIDE (ANHYDROUS)

Address/Phone No.: CTEF  
Avenue E. Van Nieuwenhuysse 4  
Box 2 - B-1160  
Bruxelles

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### 2. COMPOSITION / INFORMATION ON INGREDIENTS

#### PRODUCT DESCRIPTION

Alternative names: Hydrofluoric acid (anhydrous)  
HF  
AHF

HAZARDOUS INGREDIENT(S)	CAS No.	Symbol	R Phrases
Hydrogen Fluoride (anhydrous)	007664-39-3	T+, C	R26/27/28 R35

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### 3. HAZARDS IDENTIFICATION

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

Causes severe burns.

Is rapidly absorbed into the body causing rapid and drastic calcium depletion of tissues and serum, by binding it to the fluoride. This will result in acute and severe systemic effects.

Fluid build up on the lung (pulmonary oedema) may occur up to 48 hours after exposure and could prove fatal.

Immediate treatment is essential.

Non-flammable. May react with metals, in presence of water, to produce hydrogen, which, in certain circumstances, can form explosive mixtures with air.

#### 4. FIRST-AID MEASURES

*OBTAIN IMMEDIATE MEDICAL ATTENTION.  
SPEED IS ESSENTIAL.*

Remove from exposure area.  
Remove contaminated clothing and shoes.

It is important that anyone attempting the rescue of an affected person should wear the appropriate respiratory protection and protective clothing.

It is advisable that the following first-aid measures be undertaken before medical help arrives.

If breathing or heart has stopped resuscitate victim by artificial respiration and/or cardiac massage.  
Use oxygen if breathing is laboured.

Skin                    *DO NOT DELAY*

Quickly flush any remaining acid from the skin with copious amounts of water for a couple of minutes, then apply calcium gluconate gel as soon as possible and massage into the burnt area. Continue to massage while repeatedly applying gel at least 15 minutes after pain in the burnt area is relieved. Reapply gel if the pain reoccurs.

If calcium gluconate gel is not available CONTINUE TO FLUSH with water until it is available.

Obtain medical attention, but do not wait with the above treatment until medical attention is available.

Eyes                    *DO NOT DELAY*

Flush the eyes with eye wash solution (sterile isotonic saline solution) or water for at least 10 minutes.

Obtain medical attention immediately.

Inhalation            If breathing has stopped, apply artificial respiration.

Obtain medical attention immediately.

Keep victim at rest in comfortable position, and continue with the above measures until medical attention at the site or in a hospital has been obtained.

Ingestion            Do not induce vomiting.

If patient is conscious wash out mouth with water and give 300 ml milk or water to drink. Alternatively calcium gluconate tablets in water may be given.

Refer to hospital.

*NOTES TO FIRST AIDER:*

Patients should be accompanied by a doctor or nurse whenever possible.  
Starting application of the calcium gluconate gel as soon as possible is critical.  
Reapply gel if the pain reoccurs.

## 5. FIRE-FIGHTING MEASURES

Non-flammable. May react with metals, in the presence of water, to produce hydrogen, which, in certain circumstances, can form explosive mixtures with air.

Extinguishing Media:	Water spray should be used to cool containers. Use water to knock down escaping vapour. Do not apply water spray directly onto liquid pools of anhydrous hydrogen fluoride, as this will cause heat evolution and excessive fuming.
Fire Fighting Protective Equipment:	A self contained breathing apparatus and full protective clothing must be worn in fire conditions.

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## 6. ACCIDENTAL RELEASE MEASURES

### *CONSULT AN EXPERT*

Ensure suitable personal protection (including respiratory protection) during removal of spillages. Keep upwind. Warn people downwind.

### **Small spillages :**

Dilute carefully with copious amounts of water (50 fold dilution is recommended to minimise fume emission and heat generation). Diluted spillages should be neutralised by use of soda ash, lime or lime slurry followed by water washing.

### **Other spillages :**

If a 50 fold rapid dilution is not possible, contain spillage in bunds or by dyking.

Control the fumes by the fine water spray not applied directly onto the spill, and by water contains. Cover the spillage with polyethylene sheets to reduce the fumes.

### **Other possibilities :**

Add at least one part polyacrylamide powder (PAM) to 2 parts anhydrous HF to absorb spillage and suppress fumes. The PAM must be left for at least 30 minutes to enable it to react in depth.

Neutralise PAM residues with soda ash before disposal. After neutralisation with soda ash further treatment of the toxic soluble sodium fluoride residues may be required before final disposal.

A cold mineral oil coverage of at least 20 cm thickness will also be efficient to suppress fumes.

### *OTHER ACTIONS*

Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the appropriate regulatory body.

## 7. HANDLING AND STORAGE

### HANDLING

HF handling should only be undertaken by well trained personal wearing suitable protective equipment. Do not breathe vapour. Avoid contact with skin and eyes. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Use only in well ventilated areas.

Wear suitable personal protective clothing (see section 8).

### STORAGE

Keep at a temperature not exceeding 35°C. Keep in a cool, well ventilated place. Keep away from heat and sources of ignition. Prevent any moisture ingress. Containers should be vented periodically to a suitable scrubbing system to prevent a dangerous build up of pressure or replaced within one year.

Vessels should be pressure vessels designed to withstand the vapour pressure of HF at 47,5°C, as well as sub-atmospheric pressure which can occur if HF cools below 19,5°C.

Provide containment for tanks.

Containers must be shock-resistant.

Prohibited Materials: Dangerous in contact with glass, ceramic, cast iron or asbestos (e.g. gaskets)

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Wear suitable protective clothing, gloves and eye/face protection. PVC gloves and goggles are the minimum protection. For operations where there is a risk of exposure to HF, full protective clothing must be worn; full chemical resistant suit, acid resistant boots with suit legging secured over boots by rubber bands, PVC gauntlets with elasticated sleeves and positive air fed hood or blouse. For emergency situations a gas tight, chemical resistant suit and self contained breathing apparatus must be worn.

Occupational Exposure Limits:

HAZARDOUS INGREDIENT(S)	LTEL 8hr TWA		STEL		Time mins
	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	
Hydrogen Fluoride (as F)	-	-	3	2.5	15 OES

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

Form :	gas or fuming liquid below its boiling point.
Colour :	colourless, forms white fumes of vapour in air
Odour :	pungent, irritating
Boiling Point (°C) :	19,5
Melting Point (°C) :	-84
Vapour Pressure :	780 mmHg at 20°C
Solubility (Water) :	very soluble with evolution of heat
Solubility (Other) :	very soluble in ethanol
Specific Gravity :	0,98 at 10°C
Vapour Density (Air= 1) :	2.4 at 20 °C (HF vapor)

## 10. STABILITY AND REACTIVITY

Stable at ambient temperatures in closed containers, but hygroscopic on exposure to the atmosphere.

*Hazardous Reactions :*

Exothermic reaction with water or aqueous solutions, often violent, forming aqueous hydrofluoric acid which may result in fuming.

May react with metals, in the presence of water, to produce hydrogen, which, in certain circumstances, can form explosive mixtures with air.

Reacts violently with alkalis, lime, amines, potassium permanganate.

Attacks glass, concrete, natural rubber, leather, many organic materials and certain metals, especially those containing silica eg. cast iron.

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## 11. TOXICOLOGICAL INFORMATION

*Inhalation :*

Very toxic by inhalation. It is rapidly absorbed into the body causing rapid and drastic calcium depletion of tissues and serum, by binding it to the fluoride. This will result in acute and severe systemic effects.

Vapour is severely irritant to the respiratory tract. High atmospheric concentrations may lead to bronchitis. Fluid build up on the lung (pulmonary oedema) may occur up to 48 hours after exposure and could prove fatal.

LC<sub>50</sub> Rat - 1276 ppm HF 1 hour exposure

LC<sub>50</sub> Ape- 1774 ppm HF 1 hour exposure

*Skin Contact :*

Very toxic in contact with skin. Adverse effects similar to inhalation will occur.

May cause severe burns with permanent skin damage which are slow to heal.

*Eye Contact:*

Risk of serious damage to eyes. May cause severe burns which could lead to permanent visual effects or total loss of vision.

*Ingestion :*

Very toxic if swallowed. Adverse effects similar to inhalation will occur. Will immediately cause severe corrosion of and damage to the gastrointestinal tract. Severe irritation to the respiratory tract will also occur.

*Long Term Exposure:*

Repeated exposure by inhalation to levels well above the occupational exposure limit may produce adverse effects on the bones (fluorosis). This may also occur following the ingestion of small amounts.

Chronic studies in animals have shown that repeated exposures produce adverse effects on the mucous membranes and the cornea of the eye.

*Ames Test :*

No indication of mutagenic effects

## 12. ECOTOXICOLOGICAL INFORMATION

Ecotoxicological Information is based on the fluoride ion.

Environmental Fate and Distribution :

High tonnage material produced in wholly contained systems.  
High tonnage material used in wholly contained systems.  
Liquid with low boiling point.  
The product has potential for bioaccumulation in aquatic organisms.  
The product is predicted to have low mobility in soil.  
Large discharges of HF to the aquatic environment could lead to over-acidification with resultant damage to aquatic life.

Toxicity :

Soluble fluoride may be toxic to aquatic organisms.

LC<sub>50</sub> Fish - 60 ppm

Effect on Effluent Treatment:

The product is anticipated to be poorly removed in biological treatment processes.

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## 13. DISPOSAL CONSIDERATIONS

Disposal should be in accordance with local or national legislation.

Acid wastes should never be discharged to sewage treatment facilities without neutralisation.

Small quantities of waste acids may be added slowly to a larger volume of agitated solution of soda ash or preferably slaked lime. This neutralised solution can then be added to excess running water prior to final disposal.

Large quantities of waste acids are usually disposed of by neutralisation with lime which precipitates the fluoride ion as insoluble calcium fluoride. Other neutralising agents such as waste alkali streams, dolomite caustic potash, caustic soda and soda ash have also been successfully used. Soda ash and caustic react with waste acids to produce sodium fluoride which is soluble in water and is toxic to warm-blooded animals and must, therefore, be precipitated with lime prior to discharge.

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## 14. TRANSPORT INFORMATION

UN No.:1052 UN Packing Group: 1

AIR carriage is FORBIDDEN by air

SEA IMDG Class - primary: 8  
- subsidiary : 6.1

UN Packing Group Sea: I

Proper Shipping Name: HYDROGEN FLUORIDE, ANHYDROUS

ROAD/RAIL ADR/RID Class: 8  
ADR/RID Item No: 6  
ADR SIN (Substance identification number) : 1052

## 15. REGULATORY INFORMATION

EEC Classification:	VERY TOXIC AND CORROSIVE	
Hazard Symbol:	T+, C Very toxic, and corrosive	
Risk Phrases:	R26/27/28 R35	Very toxic by inhalation, in contact with skin and if swallowed. Causes severe burns.
Safety Phrases:	S7/9 S26 S36/37/39 S45	Keep container tightly closed and in a well ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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## 16. OTHER INFORMATION

This data sheet was prepared in accordance with Directive 91/155/EC.

Use : wide range of uses in chemical, glass, electronic, ceramic and nuclear fuel industries.

### GLOSSARY

OES :	Occupational Exposure Standard (UK HSE EH40)
STEL :	Short Term Exposure Limit
LTEL :	Long term Exposure Limit
TWA :	Time Waited Average
PAM	Polyacrylamide