

SAFETY DATA SHEET

055

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name HYDROGEN FLUORIDE
Synonym(s) 055 - SDS NUMBER • ANHYDROUS HYDROFLUORIC ACID

1.2 Uses and uses advised against

Use(s) CHEMICAL REAGENT • INDUSTRIAL APPLICATIONS • MANUFACTURING

1.3 Details of the supplier of the product

Supplier name BOC LIMITED (AUSTRALIA)
Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA
Telephone 131 262, (02) 8874 4400
Fax 132 427 (24 hours)
Website <http://www.boc.com.au>

1.4 Emergency telephone number(s)

Emergency 1800 653 572 (24/7) (Australia only)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO AUSTRALIAN WHS REGULATIONS

GHS classification(s) Acute Toxicity: Skin: Category 1
Acute Toxicity: Inhalation: Category 2
Gases Under Pressure: Liquefied gas
Skin Corrosion/Irritation: Category 1A
Acute Toxicity: Oral: Category 2

2.2 Label elements

Signal word DANGER

Pictogram(s)



Hazard statement(s)

H280 Contains gas under pressure; may explode if heated.
H300 Fatal if swallowed.
H310 Fatal in contact with skin.
H314 Causes severe skin burns and eye damage.
H330 Fatal if inhaled.

PRODUCT NAME **HYDROGEN FLUORIDE**

Prevention statement(s)

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash thoroughly after handling.
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	Wear respiratory protection.

Response statement(s)

P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
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.
P310	Immediately call a POISON CENTER or doctor/physician.
P320	Specific treatment is urgent - see first aid instructions.
P363	Wash contaminated clothing before reuse.

Storage statement(s)

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.

Disposal statement(s)

P501	Dispose of contents/container in accordance with relevant regulations.
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2.3 Other hazards

Asphyxiant. Effects are proportional to oxygen displacement.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
HYDROGEN FLUORIDE	7664-39-3	231-634-8	99.9%

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	Keep patient calm. Immediately hold eyelids apart and irrigate entire eyeball with gentle flow of water for 15 to 20 minutes. Urgently seek eye specialist attention while continuing irrigation. Calcium gluconate gel may be applied to eyes if medical attention is delayed.
Inhalation	Quickly remove from exposure. Remove contaminated clothing, check there is no obstruction to the airway if breathing is weak or has ceased and give artificial respiration, preferably using an oxygen resuscitator. In all cases summon ambulance and transport to hospital for further observation. Four effervescent calcium gluconate tablets 600 mg should be given by mouth every 2 hours until the patient is admitted to hospital.
Skin	Flush affected area with copious quantities of water. Use an emergency shower for large areas. Remove affected clothing as quickly as possible. Irrigate with tap or tepid water for 15 to 30 minutes. Do not apply chemical neutralisers. Apply sterile dressing and treat as thermal burn. Immerse large areas or limbs in tap water or tepid water for 15 to 30 minutes. Apply 10% Calcium gluconate gel to burn site. Urgently transport to hospital and recommend admission. Continue skin irrigation for up to 2 hours. Observe for symptoms of shock in severe cases.
Ingestion	Conscious patient should drink large volumes of water to dilute. Do not induce vomiting. Urgently seek medical advice.
First aid facilities	Emergency shower and eye wash basin. Calcium gluconate gel and effervescent 600 mg tablets should also be available. Air-VivaTM or Oxy-VivaTM. Water or sterile saline solution for irrigation.

4.2 Most important symptoms and effects, both acute and delayed

Gas and liquid causes severe skin burns and eye damage. Extremely corrosive to the upper and lower respiratory tracts. Onset of severe symptoms may be delayed for up to 48 hours. Initial symptoms of coughing, choking and chills lasting from 1 to 3 hours followed by symptom-free period and then onset of fever, coughing, cyanosis and pulmonary oedema. Direct contact with the liquefied material or escaping compressed gas may cause frostbite injury.

4.3 Immediate medical attention and special treatment needed

Treatment for pulmonary oedema, cold and hydrofluoric acid burns. Calcium gluconate gel is useful and may be reapplied every 15 minutes. Also the intra-cutaneous injection of a 10% solution of calcium gluconate into and around the burn. Replacement of serum electrolytes in burns involving skin areas greater than 160 cm² is recommended. Injection of corticosteroids under and around the lesion is useful.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

All known extinguishers can be used. Use water fog to cool containers from protected area.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve flammable hydrogen gas upon contact with metals.

5.3 Advice for firefighters

Temperatures in a fire may cause cylinders to rupture. Cool cylinders exposed to fire by applying water from a protected location. Do not approach cylinders suspected of being hot. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool.

5.4 Hazchem code

2XE

2 Fine Water Spray.

X Wear liquid-tight chemical protective clothing and breathing apparatus. Contain spill and run-off.

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, roll or drag cylinders. The use of mechanical devices for the handling of containers is recommended.

7.2 Conditions for safe storage, including any incompatibilities

Do not store near incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Hydrogen fluoride	SWA (AUS)	3	2.6	--	--

PRODUCT NAME HYDROGEN FLUORIDE**Biological limits**

Ingredient	Determinant	Sampling Time	BEI
HYDROGEN FLUORIDE	Fluoride in urine	Prior to shift	2 mg/L
	Fluoride in urine	End of shift	3 mg/L

Reference: ACGIH Biological Exposure Indices

8.2 Exposure controls**Engineering controls** Use only in well-ventilated areas. Maintain vapour levels below the recommended exposure standard.**PPE**

Eye / Face	Wear safety glasses.
Hands	Wear rubber gloves.
Body	Wear coveralls and safety boots.
Respiratory	Wear a Full-face Type B (Inorganic and Acid gas) respirator. Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	COLOURLESS GAS OR LIQUID (WILL FUME IN MOIST AIR)
Odour	PUNGENT IRRITATING ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT APPLICABLE
Boiling point	19.5°C
Melting point	-83°C
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	0.69 (Air = 1)
Specific gravity	NOT APPLICABLE
Solubility (water)	VERY SOLUBLE
Vapour pressure	131 kPa @ 25°C
Upper explosion limit	NOT APPLICABLE
Lower explosion limit	NOT APPLICABLE
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

% Volatiles	100 %
Critical pressure	6485 kPa
Critical temperature	188°C
Density	0.957 kg/L @ 19.5°C (Liquid)

10. STABILITY AND REACTIVITY

10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

10.2 Chemical stability

Stable under recommended conditions of storage.

PRODUCT NAME HYDROGEN FLUORIDE

10.3 Possibility of hazardous reactions

Polymerization will not occur.

10.4 Conditions to avoid

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

10.5 Incompatible materials

No information provided.

10.6 Hazardous decomposition products

May evolve toxic gases if heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Information available for the product:

Fatal if inhaled, in contact with skin and if swallowed. Extremely corrosive to eyes, skin and the upper and lower respiratory tracts. Excessive irritation of the lungs causes acute pneumonitis and pulmonary oedema that can be fatal.

Information available for the ingredient(s):

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
HYDROGEN FLUORIDE	--	--	1276 ppm/1 hour (rat)

Skin	Corrosive. Irritating and corrosive in contact with skin. Skin burns exhibit severe pain, redness, possible swelling and early necrosis.
Eye	Causes severe burns. Contact may result in irritation, lacrimation, pain, redness and corneal burns with possible permanent eye damage.
Sensitization	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT – single exposure	Corrosive - toxic. Over exposure may result in irritation of the nose and throat, coughing and shortness of breath (dyspnoea). High level exposure may result in ulceration of the respiratory tract, lung tissue damage and pulmonary oedema. Effects may be delayed.
STOT – repeated exposure	Chronic exposure has been associated with fluorosis, malaise, anemia, leukopenia, discoloration of teeth, osteosclerosis, hyperostosis, and liver or kidney damage.
Aspiration	Not classified as causing aspiration.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No information provided.

12.2 Persistence and degradability

No information provided.

12.3 Bioaccumulative potential

No information provided.

12.4 Mobility in soil

No information provided.

12.5 Other adverse effects

Hazardous to the environment. Hazardous to animals as per man. Highly toxic to aquatic life. Will decrease pH in aqueous ecological systems. Toxic to plants above 0.1 ppm. Hydrogen fluoride released to the atmosphere will absorb moisture to form hydrofluoric acid which is extremely corrosive to metals and living tissue.

13. DISPOSAL CONSIDERATIONS

PRODUCT NAME HYDROGEN FLUORIDE**13.1 Waste treatment methods**

Waste disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents. Avoid discharge to atmosphere.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1052	1052	1052
14.2 Proper Shipping Name	HYDROGEN FLUORIDE, ANHYDROUS	HYDROGEN FLUORIDE, ANHYDROUS	HYDROGEN FLUORIDE, ANHYDROUS
14.3 Transport hazard classes	8, 6.1	8, 6.1	8, 6.1
14.4 Packing Group	I	I	I

14.5 Environmental hazards No information provided**14.6 Special precautions for user**

Hazchem code	2XE
GTEPG	8C4
EMS	F-C, S-U
Other information	Ensure cylinder is separated from driver and foodstuffs.

15. REGULATORY INFORMATION

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

Poison schedule	Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).	
Classifications	Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals. The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].	
Hazard codes	C T+	Corrosive Very toxic
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).
Inventory listing(s)	AUSTRALIA: AICS (Australian Inventory of Chemical Substances) All components are listed on AICS, or are exempt.	

16. OTHER INFORMATION

Additional information

PRODUCT NAME HYDROGEN FLUORIDE

The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

APPLICATION METHOD: Gas withdrawal: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

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