SAFETY DATA SHEET

According to OSHA Hazcom Standard 29 CFR 1910.1200

Buffered Oxide Etchant 6:1

Date of issue: 2019-11-27 **Revision date: 2025-07-08** **Version: 5.0**

1. IDENTIFICATION

A. Product name

- Buffered Oxide Etchant 6:1

B. Recommended use and restriction on use

- General use : for experimental, research and industrial use
- Restriction on use : Never drink, Not used except for experimental, research and industrial applications.

C. Manufacturer / Supplier / Distributor information

○ **Manufacturer information**

- Company name : DUKSAN PURE CHEMICALS
- Address : 53,SINWONRO 133BEONGIL, DANWONGU, ANSANSHI, GYUNGGIDO, KOREA
- Emergency telephone number : 82-31-495-4055

○ **Supplier/Distributer information**

- Company name : DUKSAN PURE CHEMICALS
- Address : 53,SINWONRO 133BEONGIL, DANWONGU, ANSANSHI, GYUNGGIDO, KOREA
- Emergency telephone number : 82-31-495-4055

2. HAZARD IDENTIFICATION

A. GHS Classification

- Corrosive to metals : Category1
- Acute toxicity (oral) : Category3
- Acute toxicity (dermal) : Category2
- Acute toxicity (inhalation: vapor) : Category3
- Skin corrosion/irritation : Category1A
- Serious eye damage/irritation : Category1

B. GHS label elements

○ **Hazard symbols**



○ **Signal words**

- Danger

○ **Hazard statements**

- H290 May be corrosive to metals
- H301 Toxic if swallowed
- H310 Fatal in contact with skin
- H314 Causes severe skin burns and eye damage
- H318 Causes serious eye damage
- H331 Toxic if inhaled

○ **Precautionary statements**

1) Prevention

- P234 Keep only in original packaging.

- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
- P262 Do not get in eyes, on skin, or on clothing.
- P264 Wash hands 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/hearing protection.

2) Response

- P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- P302+P352 IF ON SKIN: 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 person to fresh air and keep 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.
- P311 Call a POISON CENTER or doctor/physician.
- P321 Specific treatment (if in eyes, wash with plenty of running water; if in contact with skin, wash with plenty of running water; if inhaled, move to fresh air; if ingested, seek medical advice on whether to induce vomiting).
- P330 Rinse mouth.
- P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
- P363 Wash contaminated clothing before reuse.
- P390 Absorb spillage to prevent material damage.

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.
- P406 Store in corrosion resistant container with a resistant inner liner.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification

- Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Water	Aqua; Dihydrogen oxide	7732-18-5	55~61
Ammonium fluoride	Ammonium fluoride ((Nh4)F) ; Neutral ammonium fluoride	12125-01-8	33~37
Hydrogen fluoride	Fluorohydric acid ; Aqueous hydrogen fluoride ;	7664-39-3	6~8

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.
- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- Wash thoroughly after handling.

C. Inhalation contact

- Take specific treatment if needed.
- When exposed to large amounts of steam and mist, move to fresh air.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.
- Take the doctor's examination.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.
- Take the doctor's examination.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Avoid use of water jet for extinguishing
- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray

B. Specific hazards arising from the chemical

- Causes serious eye damage
- Causes severe skin burns and eye damage
- Fatal in contact with skin
- May be corrosive to metals
- Toxic if inhaled

C. Special protective actions for firefighters

- Avoid inhalation of materials or combustion by-products.
- Cool containers with water until well after fire is out.
- Do not approach the tank surrounded by fire until it is extinguished.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Keep unauthorized personnel out.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Do not touch spilled material. Stop leak if you can do it without risk.
- Handle the damaged containers or spilled material after wearing appropriate protective equipment
- Move container to safe area from the leak area.
- Must work against the wind, let the upwind people to evacuate.
- Remove all sources of ignition.

B. Environmental precautions

- If large amounts have been spilled, inform the relevant authorities.
- Prevent runoff and contact with waterways, drains or sewers.

C. Methods and materials for containment and cleaning up

- Appropriate container for disposal of spilled material collected.
- Dike for later disposal.
- Disposal of waste shall be in compliance with the Wastes Control Act
- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not handle until all safety precautions have been read and understood.

B. Conditions for safe storage, including any incompatibilities

- Avoid direct sunlight.
- Check regularly for leaks.
- Do not apply any physical shock to container.
- Do not apply direct heat.
- Do not use damaged containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

○ **ACGIH TLV**

- [Hydrogen fluoride] : TWA, 0.5 ppm, as F, Ceiling, 2 ppm, as F Skin

○ **OSHA PEL**

- [Hydrogen fluoride] : 3 ppm

B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Individual protection measures, such as personal protective equipment

○ **Respiratory protection**

- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Consider warning properties before use.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- Respiratory protection is ranked in order from minimum to maximum.
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

○ **Eye protection**

- Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

○ **Hand protection**

- Wear appropriate chemical resistant glove.

○ **Skin protection**

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid
- Color	Not available
B. Odor	Not available
C. Odor threshold	Not available
D. pH	1.0(0.10M HF)
E. Melting point/Freezing point	10℃
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available

J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	14mmHg(20℃) : HF
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity(Relative density)	1.05~1.15
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

10. STABILITY AND REACTIVITY

A. Chemical Stability

- Stable under normal conditions of use and storage.

B. Possibility of hazardous reactions

- May be corrosive to metals.

C. Conditions to avoid

- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with incompatible materials and condition.
- Avoid contact with metals.

D. Incompatible materials

- Avoid contact with strong oxidizing agent and strong reducing agent.

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

○ **Respiratory tracts**

- Not available

○ **Oral**

- Toxic if swallowed

○ **Eye·Skin**

- Causes serious eye damage
- Causes severe skin burns and eye damage

B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- Product (ATEmix) : 50mg/kg < ATEmix <= 300mg/kg
- [Water] : LD50 > 90000 ㎎/㎏ Rat (LD50 > 90 ml/kg) (HSDB)
- [Ammonium fluoride] : LD50 ca. 223 mg/kg Rat (Read-across CAS no. 7681-49-4) (EPA OPPTS 870.1100, GLP) (ECHA)
- [Hydrogen fluoride] : Not available

*** Dermal**

- Product (ATEmix) : 50mg/kg < ATEmix <= 200mg/kg
- [Ammonium fluoride] : LD50 200~1000 mg/kg, EU Harmonised Cat. 3 (ECHA)
- [Hydrogen fluoride] : LD50 0~50 mg/kg (EU Harmonized Cat. 1) (ECHA)

*** Inhalation**

- Product (ATEmix) : 2.0mg/L 4hr < ATEmix <= 10.0mg/L 4hr
- [Ammonium fluoride] : Dust LC50 1 mg/L 4 hr Rat (Read-across NaF) (OECD TG 403, GLP) (ECHA)
- [Hydrogen fluoride] : Vapor LC50 0.5350 mg/L 4 hr (1310 ppm 1 hr) Rat (NIER), EU Harmonised Cat. 2 (ECHA)

○ **Skin corrosion/irritation**

- Causes severe skin burns and eye damage

○ **Serious eye damage/irritation**

- Causes serious eye damage

○ **Respiratory sensitization**

- Not available

○ **Skin sensitization**

- Not available

○ **Carcinogenicity**

*** IARC**

- Not available

*** OSHA**

- Not available

*** ACGIH**

- Not available

*** NTP**

- Not available

*** EU CLP**

- Not available

○ **Germ cell mutagenicity**

- Not available

○ **Reproductive toxicity**

- Not available

○ **STOT-single exposure**

- Not available

○ **STOT-repeated exposure**

- Not available

○ **Aspiration hazard**

- Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ **Fish**

- [Ammonium fluoride] : LC50 209 mg/L 96hr Cyprinus carpio (Read-across CAS no.12125-02-9) (OECD TG 203), NOEC 11.8 mg/L 28d Pimephales promelas (Read-across CAS no.12125-02-9) (OECD TG 212) (EHCA)
- [Hydrogen fluoride] : LC50 107.5 ppm(Fluoride) 96hr Oncorhynchus mykiss (NIER)

○ **Crustaceans**

- [Ammonium fluoride] : EC50 101 mg/L 48hr Daphnia magna (Read-across CAS no.12125-02-9) (OECD TG 202) (ECHA), NOEC 12.5 mg/L 21d Daphnia magna (NIER)
- [Hydrogen fluoride] : EC50 26~48 mg/L 48hr Trichoptera aquatic larvae (Read-across CAS# 7681-49-4), NOEC 8.9 mg/L 21d Daphnia magna (ECHA)

○ **Algae**

- [Ammonium fluoride] : ErC50 > 6.07 mg/L 72hr Pseudokirchneriella subcapitata (NIER), NOEC 26.8 mg/L 10d Navicula sp. (Read-across CAS no.12125-02-9) (ECHA)
- [Hydrogen fluoride] : EC50 43 mg/L, NOEC ≥ 50 ~ ≤ 200 mg/L 96hr various algae species (ECHA)

B. Persistence and degradability

○ **Persistence**

- [Water] : log Kow -1.38 (HSDB)
- [Ammonium fluoride] : log Kow -4.37 (est) (HSDB)

○ **Degradability**

- Not available

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Ammonium fluoride] : BCF 53~58 (Freshwater Fish, Read-across CAS no.7664-39-3) (ECHA)
- [Hydrogen fluoride] : BCF 149 L/kg Seawater fish (ECHA)

○ **Biodegradation**

- Not available

D. Mobility in soil

- Not available

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- It shall be treated by incineration
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable
- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them

B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 2922

B. Proper shipping name

- CORROSIVE LIQUID, TOXIC, N.O.S.

C. Hazard Class

- 8

D. IMDG CODE/IATA DGR Packing group

- II

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-B (Corrosive substances)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

○ **POPs Management Law**

- Not applicable

○ **Information of EU Classification**

*** Classification**

- [Ammonium fluoride] : H301,H311,H331
- [Hydrogen fluoride] : H300,H310,H314,H330

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- [Hydrogen fluoride] : 453.599 kg 1000 lb

*** CERCLA Section 103 (40CFR302.4)**

- [Ammonium fluoride] : 45.3599 kg 100 lb

- [Hydrogen fluoride] : 45.3599 kg 100 lb

*** EPCRA Section 302 (40CFR355.30)**

- [Hydrogen fluoride] : 45.3599 kg 100 lb

*** EPCRA Section 304 (40CFR355.40)**

- [Hydrogen fluoride] : 45.3599 kg 100 lb

*** EPCRA Section 313 (40CFR372.65)**

- [Hydrogen fluoride] : Applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2019-11-27

C. Revision number and Last date revised

- 4 times, 2025-07-08

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).