SAFETY DATA SHEET

1. Identification

Product identifier: BUFFERED OXIDE ETCH

Other means of identification

Product No.: 5569, 5554, 5540, 1188, 1198, 1178, 5361, 5329, 5326, 5192, 9354, 5175, 5173, 9294

Recommended use and restriction on use

Recommended use: Not available.
Restrictions on use: Not known.

Details of the supplier of the safety data sheet

Manufacturer

Company Name: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway, Suite 200
Center Valley, PA 18034

Telephone: Customer Service: 855-282-6867

Fax: 610-573-2610
Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

Emergency telephone number:
CHEMTREC: 1-800-424-9300 within US and Canada
CHEMTREC: 1-703-527-3887 outside US and Canada

2. Hazard(s) identification

Hazard Classification

Physical Hazards

Corrosive to metals	Category 1

Health Hazards

Acute toxicity (Oral)	Category 2
Acute toxicity (Dermal)	Category 2
Acute toxicity (Inhalation - vapor)	Category 2
Skin Corrosion/Irritation	Category 1
Serious Eye Damage/Eye Irritation	Category 1
Specific Target Organ Toxicity - Single Exposure	Category 1
Specific Target Organ Toxicity - Repeated Exposure	Category 1

Label Elements

Hazard Symbol:

Signal Word: Danger

Hazard Statement:
May be corrosive to metals.
Fatal if swallowed.
Fatal in contact with skin.
Fatal if inhaled.
Causes severe skin burns and eye damage.
Causes damage to organs.
Causes damage to organs through prolonged or repeated exposure.

Precautionary Statement

Prevention: Keep only in original container. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Do not get in eyes, on skin, or on clothing. Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear respiratory protection.

Response: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth. IF exposed: Call a POISON CENTER or doctor/physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Take off immediately all contaminated clothing and wash it before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage: Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical Identity	Common name and synonyms	CAS number	Content in percent (%)*
AMMONIUM FLUORIDE		12125-01-8	30 - 40%
HYDROGEN FLUORIDE		7664-39-3	1 - 10%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion:	Call a physician or poison control center immediately. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Inhalation:	Move to fresh air. Call a physician or poison control center immediately. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration.
Skin Contact:	Immediately remove contaminated clothing and shoes and wash skin with soap and plenty of water. Call a physician or poison control center immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
Eye contact:	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air.

Most important symptoms/effects, acute and delayed

Symptoms:	Fatal if swallowed. Fatal in contact with skin. Fatal if inhaled. Causes severe skin and eye burns.

Indication of immediate medical attention and special treatment needed

Treatment:	Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards:	Fire may produce irritating, corrosive and/or toxic gases.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media:	None known.
Specific hazards arising from the chemical:	Product is acidic. Fire may produce irritating, corrosive and/or toxic gases.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out. Fight fire from a protected location.
Special protective equipment for fire-fighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Use personal protective equipment. Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Neutralize spill area and washings with soda ash or lime. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Dike for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Wash hands thoroughly after handling. Avoid inhalation of vapors and spray mists. Do not eat, drink or smoke when using the product. Use caution when adding this material to water. Never add water to acid! Always add acid to water while stirring to prevent release of heat, steam and fumes. See Section 8 of the SDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities: Do not store in metal containers. Keep containers tightly closed. Store in cool, dry place. Store in a well-ventilated place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	type	Exposure Limit Values	Source
AMMONIUM FLUORIDE - as F	TWA	2.5 mg/m3	US. ACGIH Threshold Limit Values (2011)
	REL	2.5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	PEL	2.5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	2.5 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
AMMONIUM FLUORIDE - Dust.	TWA	2.5 mg/m3	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)
HYDROGEN FLUORIDE - as F	TWA	0.5 ppm	US. ACGIH Threshold Limit Values (2011)
	Ceiling	2 ppm	US. ACGIH Threshold Limit Values (2011)
HYDROGEN FLUORIDE	REL	3 ppm 2.5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	Ceil_Time	6 ppm 5 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
HYDROGEN FLUORIDE - as F	PEL	2.5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	3 ppm	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	STEL	6 ppm	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
HYDROGEN FLUORIDE	TWA	3 ppm	US. OSHA Table Z-2 (29 CFR 1910.1000) (02 2006)

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
AMMONIUM FLUORIDE (Fluoride: Sampling time: Prior to shift.)	2 mg/l (Urine)	ACGIH BEL (03 2013)
AMMONIUM FLUORIDE (Fluoride: Sampling time: End of shift.)	3 mg/l (Urine)	ACGIH BEL (03 2013)
HYDROGEN FLUORIDE (Fluoride: Sampling time: Prior to shift.)	2 mg/l (Urine)	ACGIH BEL (03 2013)
HYDROGEN FLUORIDE (Fluoride: Sampling time: End of shift.)	3 mg/l (Urine)	ACGIH BEL (03 2013)

Appropriate Engineering Controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Chemical respirator with acid gas cartridge.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state: liquid
Form: liquid
Color: Colorless
Odor: No data available.
Odor threshold: No data available.
pH: No data available.
Melting point/freezing point: 18 °C
Initial boiling point and boiling range: No data available.
Flash Point: not applicable
Evaporation rate: As water

Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Relative density:	1.1 (20 °C)
Solubility(ies)	
Solubility in water:	Miscible with water.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Heat. Water, moisture.
Incompatible Materials:	Strong oxidizing agents. Acids. Bases, alkalies (organic). Ammonia. Strong bases. Sulfuric acid. Organic compounds. Glass. Fluorine. Cyanides. Metals. May attack some plastics, rubber and coatings.
Hazardous Decomposition Products:	Hydrogen fluoride. Nitrogen Oxides

11. Toxicological information

Information on likely routes of exposure

Ingestion:	Fatal if swallowed. May cause burns of the gastrointestinal tract if swallowed.
Inhalation:	Fatal if inhaled. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.
Skin Contact:	Fatal in contact with skin. Causes severe skin burns.
Eye contact:	Causes serious eye damage.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: LD 50 (Rat): 45.45 mg/kg

Dermal
Product: LD 50 (Rabbit): 51.73 mg/kg

Inhalation
Product: LC 50 (Rat, 4 h): 0.385 mg/l

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: Causes severe skin burns.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye damage.

Respiratory or Skin Sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: Blood. Cardiovascular system Respiratory system

Specific Target Organ Toxicity - Repeated Exposure
Product: Endocrine system Bones Teeth.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative Potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Specified substance(s):
AMMONIUM FLUORIDE Log Kow: -4.37

Mobility in Soil: The product is water soluble and may spread in water systems.

Other Adverse Effects: The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN Number:	UN 2922
UN Proper Shipping Name:	Corrosive liquids, toxic, n.o.s.(HYDROFLUORIC ACID, Ammonium Fluoride)
Transport Hazard Class(es)	
Class(es):	8, 6.1
Label(s):	8, 6.1
Packing Group:	II
Marine Pollutant:	Not a Marine Pollutant
Special precautions for user:	–

IMDG

UN Number:	UN 2922
UN Proper Shipping Name:	CORROSIVE LIQUID, TOXIC, N.O.S.(HYDROFLUORIC ACID, Ammonium Fluoride)
Transport Hazard Class(es)	
Class(es):	8, 6.1
Label(s):	8, 6.1
EmS No.:	F-A, S-B
Packing Group:	II
Marine Pollutant:	Not a Marine Pollutant
Special precautions for user:	–

IATA

UN Number:	UN 2922
Proper Shipping Name:	Corrosive liquid, toxic, n.o.s.(HYDROFLUORIC ACID, Ammonium Fluoride)
Transport Hazard Class(es):	
Class(es):	8, 6.1
Label(s):	8, 6.1
Marine Pollutant:	Not a Marine Pollutant
Packing Group:	II
Special precautions for user:	–

15. Regulatory information

US Federal Regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity
AMMONIUM FLUORIDE	100 lbs.
HYDROGEN FLUORIDE	100 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute (Immediate)
Chronic (Delayed)

SARA 302 Extremely Hazardous Substance

Chemical Identity	Reportable quantity	Threshold Planning Quantity
HYDROGEN FLUORIDE	100 lbs.	100 lbs.

SARA 304 Emergency Release Notification

Chemical Identity	Reportable quantity
AMMONIUM FLUORIDE	100 lbs.
HYDROGEN FLUORIDE	100 lbs.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
HYDROGEN FLUORIDE	100lbs
AMMONIUM FLUORIDE	10000 lbs
HYDROGEN FLUORIDE	10000 lbs

SARA 313 (TRI Reporting)

Chemical Identity	Reporting threshold for other users	Reporting threshold for manufacturing and processing
AMMONIUM FLUORIDE	10000 lbs	25000 lbs.
HYDROGEN FLUORIDE	10000 lbs	25000 lbs.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)

Chemical Identity	Reportable quantity
AMMONIUM FLUORIDE	Reportable quantity: 100 lbs.
HYDROGEN FLUORIDE	Reportable quantity: 100 lbs.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

Chemical Identity	Reportable quantity
HYDROGEN FLUORIDE	1000 lbs

US State Regulations

US. California Proposition 65

No ingredient regulated by CA Prop 65 present.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
AMMONIUM FLUORIDE
HYDROGEN FLUORIDE

US. Massachusetts RTK - Substance List

Chemical Identity
AMMONIUM FLUORIDE
HYDROGEN FLUORIDE

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
AMMONIUM FLUORIDE
HYDROGEN FLUORIDE

US. Rhode Island RTK

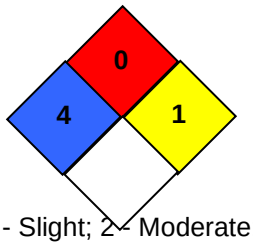
Chemical Identity
AMMONIUM FLUORIDE
HYDROGEN FLUORIDE

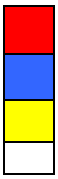
Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16.Other information, including date of preparation or last revision

NFPA Hazard ID





Flammability
Health
Reactivity
Special hazard.

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	03-24-2016
Revision Date:	No data available.
Version #:	1.2
Further Information:	No data available.

Disclaimer:

THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET (MSDS/SDS) WAS PREPARED BY TECHNICAL PERSONNEL BASED ON DATA THAT THEY BELIEVE IN THEIR GOOD FAITH JUDGMENT IS ACCURATE. HOWEVER, THE INFORMATION PROVIDED HEREIN IS PROVIDED “AS IS,” AND AVANTOR PERFORMANCE MATERIALS MAKES AND GIVES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, AND EXPRESSLY DISCLAIMS ALL WARRANTIES REGARDING SUCH INFORMATION AND THE PRODUCT TO WHICH IT RELATES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION, WARRANTIES OF ACCURACY, COMPLETENESS, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY, STABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS MSDS/SDS IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PROPERLY TRAINED PERSON USING THIS PRODUCT, AND IS NOT INTENDED TO BE COMPREHENSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING, STORAGE, OR DISPOSAL OF THE PRODUCT. INDIVIDUALS RECEIVING THIS MSDS/SDS MUST ALWAYS EXERCISE THEIR OWN INDEPENDENT JUDGMENT IN DETERMINING THE APPROPRIATENESS OF SUCH ISSUES. ACCORDINGLY, AVANTOR PERFORMANCE MATERIALS ASSUMES NO LIABILITY WHATSOEVER FOR THE USE OF OR RELIANCE UPON THIS INFORMATION. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS, A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR TO VIOLATE ANY FEDERAL, STATE, LOCAL, OR FOREIGN LAWS. AVANTOR PERFORMANCE MATERIALS REMINDS YOU THAT IT IS YOUR LEGAL DUTY TO MAKE ALL INFORMATION IN THIS MSDS/SDS AVAILABLE TO YOUR EMPLOYEES.