

1 PRODUCT AND COMPANY IDENTIFICATION**Product Name:** 777 ETCH; CPG GRADE**Product Number:** 00000000000820072**Synonyms:** None**Company:**FUJIFILM Electronic Materials U.S.A., Inc.
80 Circuit Road
North Kingstown, RI 02852**Emergency Telephone:**Transportation Emergency:FOR ALL TRANSPORTATION ACCIDENTS,
CALL CHEMTREC: 1-800-424-9300Medical Emergency (24HR):FOR ANY HEALTH & MEDICAL
EMERGENCY, 24 HOURS /7 DAYS CALL:
1-800-365-8951**Non-emergency Telephone:**General Information:FOR ALL MSDS REQUESTS & QUESTIONS,
CALL CUSTOMER SERVICE: 1-800-553-6546**Intended Use:** Etch**2 HAZARDS IDENTIFICATION****Emergency Overview****Physical State:** Liquid**Color:** Colorless to pale yellow**Odor:** Vinegar-like**DANGER!**

Causes skin, eye and digestive tract burns. Causes respiratory tract irritation. Harmful if swallowed. May be harmful if absorbed through skin. May cause damage to the kidneys. May cause central nervous system effects. High concentrations: May adversely affect the developing fetus based on animal data.

Potential Health Effects**Inhalation:** Causes respiratory tract irritation. May cause central nervous system effects. May cause lung edema. The effects might be delayed.**Eye Contact:** Corrosive. Prolonged contact causes serious eye and tissue damage.**Skin Contact:** Causes skin burns. May be harmful if absorbed through skin.**Ingestion:** Harmful if swallowed. Causes digestive tract burns. May cause burns in mucous membranes, throat, esophagus and stomach. May cause damage to the kidneys. High concentrations: May cause harm to the unborn child.**Chronic Health Effects:** High concentrations: Possible reproductive hazard that may cause adverse

reproductive effects based on animal data. Fluorides: Can cause bone damage.

Target Organ(s): | Respiratory system | Eye | Kidney | Central nervous system | Bone structure | Reproductive system | Skin |

Potential Physical / Chemical Effects: This product is not flammable or combustible.

OSHA Regulatory Status: This product is hazardous according to OSHA 29CFR 1910.1200.

Environment: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

3 COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Concentration*
†Acetic acid	64-19-7	28 - 35%
†Ammonium fluoride	12125-01-8	10 - 15%
†Ethylene glycol	107-21-1	4.75 - 15%

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

† This chemical is hazardous according to OSHA/WHMIS criteria.

4 FIRST AID MEASURES

Inhalation: Move injured person into fresh air and keep person calm under observation. Get medical attention immediately. The effects might be delayed.

Eye Contact: Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes. Make sure to remove any contact lenses from the eyes before rinsing.

Skin Contact: Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Chemical burns must be treated by a physician. Get medical attention immediately.

Ingestion: Rinse mouth thoroughly with water and give large amounts of milk or water, if person is conscious. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Obtain medical attention and take along this material safety data sheet.

Note to Physician: Get medical attention if symptoms occur.

5 FIRE-FIGHTING MEASURES

Extinguishing Media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable Extinguishing Media: None.

Special Fire Fighting Procedures: Use standard firefighting procedures and consider the hazards of other involved materials. Containers close to fire should be removed or cooled with water.

Unusual Fire & Explosion Hazards: During fire, gases hazardous to health may be formed.

Hazardous Combustion Products: Ammonia, Carbon Dioxide, Carbon Monoxide, Hydrogen fluoride, Nitrogen Oxides

Protective Measures: Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace. Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Flammability Class: 1

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Ventilate the area. Avoid inhalation of vapors and spray mist and contact with skin and eyes. Wear suitable protective clothing. See Section 8 of the MSDS for Personal Protective Equipment.

Spill Cleanup Methods: Absorb spillage with suitable absorbent material. For waste disposal, see section 13 of the MSDS.

Environmental Precautions: Avoid discharge into drains, water courses or onto the ground unless authorized by permit.

7 HANDLING AND STORAGE

Handling: Local exhaust is recommended. Avoid inhalation of vapors and contact with skin and eyes. Wear approved safety goggles. Wear protective gloves and appropriate clothing to prevent skin contact. Observe good industrial hygiene practices.

Storage: Store in closed original container in a dry place. Store away from incompatible materials.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	Source	Type	Exposure Limits	Notes
Acetic acid	US. ACGIH TLV	STEL	15 ppm	
Acetic acid	US. ACGIH TLV	TWA	10 ppm	
Acetic acid	US. NIOSH Guide	IDLH	50 ppm	
Acetic acid	US. OSHA Z-1 PEL	TWA	25 mg/m ³ 10 ppm	
Ammonium fluoride	US. ACGIH TLV	TWA	2.5 mg/m ³	as F
Ammonium fluoride	US. NIOSH Guide	IDLH	250 mg/m ³	
Ammonium fluoride	US. OSHA Z-1 PEL	TWA	2.5 mg/m ³	as F
Ammonium fluoride (Dust.)	US. OSHA Z-2 PEL	TWA	2.5 mg/m ³	
Ethylene glycol (Aerosol.)	US. ACGIH TLV	Ceiling	100 mg/m ³	

Consult Canadian Provincial Regulations and/or Mexican Regulations on exposure limits, if applicable.

Engineering Controls: Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of vapors. Eye wash facilities and emergency shower must be available

when handling this product.

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. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Use a NIOSH/MSHA approved air purifying respirator as needed to control exposure. Consult with respirator manufacturer to determine respirator selection, use, and limitations. Use positive pressure air supplied respirator for uncontrolled releases or when air purifying respirator limitations may be exceeded. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use.

Eye Protection: Wear approved safety goggles.

Hand Protection: Wear protective gloves. Be aware that the liquid may penetrate the gloves. Frequent change is advisable. Suitable gloves can be recommended by the glove supplier.

Skin Protection: Wear appropriate chemical resistant clothing to prevent any possibility of skin contact.

Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight:	Not applicable.
Physical State:	Liquid
Color:	Colorless to pale yellow
Odor:	Vinegar-like
Odor Threshold:	No data available.
pH:	4 - 6 (@ 25°C)
Freezing Point:	No data available.
Boiling Point:	121°C (250°F)
Density:	1.063 g/cc
Specific Gravity (=Relative Density):	1.063
Vapor Pressure:	No data available.
Vapor Density (Air=1):	No data available.
Evaporation Rate:	1 (water=1)
Volatiles, % by vol:	75 %Vol - 80 %Vol
Solubility in Water:	Completely miscible
Solubility (Other):	No data available.
Partition Coefficient (n-Octanol/water):	No data available.
Flash Point:	>93°C (200°F) (Pensky-Martens Closed Cup)
Autoignition Temperature:	Not applicable.
Viscosity:	No data available.
Upper Flammability /	
Explosion limit in air %:	Not applicable.
Lower Flammability /	
Explosion limit in air %:	Not applicable.
Decomposition Temperature:	No data available.

10 STABILITY AND REACTIVITY

Stability: Stable under normal temperature conditions

Conditions to Avoid: Excessive heat.

Incompatible Materials: Oxidizing materials. Strong acids. Strong bases. Metals. Peroxides. Amines. Alcohols.

Hazardous Decomposition Products:

At Elevated Temperatures:	Ammonia, Carbon Dioxide, Carbon Monoxide, Hydrogen fluoride, Nitrogen Oxides
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Possibility of Hazardous Reactions: Will not occur.

11 TOXICOLOGICAL INFORMATION**Specified Substance(s)****Acute Toxicity:**

Chemical Name	Test Results
Acetic acid	Dermal LD50 (Rabbit): 1060 mg/kg
Acetic acid	Oral LD50 (Rat): 3310 mg/kg
Ethylene glycol	Dermal LD50 (Rabbit): 9530 mg/kg
Ethylene glycol	Oral LD50 (Rat): 4700 mg/kg

Other Acute: Ammonium fluoride: Harmful if swallowed. Causes skin, eye and respiratory tract irritation. Ethylene glycol: Harmful if swallowed. May cause eye, skin and respiratory tract irritation. May cause damage to the kidneys. May cause central nervous system effects. High concentration: May cause harm to the unborn child. Acetic acid: Causes skin, eye and digestive tract burns. May be harmful if absorbed through skin.

Chronic Toxicity: Acetic acid: May cause lung edema. Ammonium fluoride: Can cause bone damage.

Listed Carcinogens:

Chemical Name	IARC	NTP	OSHA	ACGIH
Ethylene glycol	Not Listed	Not Listed	Not Listed	A4
Ammonium fluoride	3	Not Listed	Not Listed	A4

IARC: 1 = Carcinogenic to Humans; 2A = Probably Carcinogenic to Humans; 2B = Possibly Carcinogenic to Humans; 3 = Not classifiable as to carcinogenicity to humans; 4 = Probably not carcinogenic to humans; Not listed = Not evaluated by IARC. ACGIH: A1 = Confirmed Human Carcinogen; A2 = Suspected Human Carcinogen; A3 = Confirmed Animal Carcinogen; A4 = Not classifiable as a human carcinogen; A5 = Not suspected to be a human carcinogen; Not listed = Not evaluated by ACGIH.

Product Information

Acute Toxicity: Causes skin, eye and digestive tract burns. Causes respiratory tract irritation. Harmful if swallowed. May be harmful if absorbed through skin. May cause damage to the kidneys. May cause central nervous system effects. High concentrations: May cause harm to the unborn child.

Chronic Toxicity: Prolonged overexposure to fluorides may increase fluoride content of bones and teeth, and may result in fluorosis, with mottling of teeth (in children) and brittleness of bones.

12 ECOLOGICAL INFORMATION

Ecotoxicity: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Specified Substance(s)

Chemical Name	Test
Acetic acid	EC50 (24 hour(s), Daphnia): 6000 mg/l
Acetic acid	LC50 (48 hour(s), Common Shrimp (<i>C. crangon</i>)): 100-330 mg/l
Acetic acid	LC50 (96 hour(s), Fathead Minnow): 88 mg/l
Acetic acid	LC50 (48 hour(s), Green crab (<i>carcinus maenas</i>)): 180 mg/l
Acetic acid	LC50 (96 hour(s), Mosquito fish (<i>G. affinis</i>)): 251 mg/l
Acetic acid	LC50 (72 hour(s), <i>Ictalurus punctatus</i>): 446 mg/l
Ammonium fluoride	EC50 (96 hour(s), Algae): 43 mg/l
Ammonium fluoride	EC50 (48 hour(s), Daphnia): 97 mg/l
Ammonium fluoride	LC50 (96 hour(s), Fish): 51 mg/l
Ethylene glycol	LC50 (96 hour(s), Fish): >100 mg/l

Mobility: The product is miscible with water. May spread in water systems. The product contains organic solvents which will evaporate easily from all surfaces.

Persistence and Degradability: No data available.

Bioaccumulation Potential: No data available.

Other Adverse Effects: No data available.

13 DISPOSAL CONSIDERATIONS

Disposal Methods: Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

14 TRANSPORT INFORMATION**DOT**

UN No.: UN1760

Proper Shipping Name: Corrosive liquids, n.o.s. (Acetic acid, Ammonium fluoride)

Class: 8

Packing Group: II

Label(s): 8

TDG

UN No.: UN1760

Proper Shipping Name: Corrosive liquids, n.o.s. (Acetic acid, Ammonium fluoride)

Class: 8

Packing Group: II

IATA**UN No.:** UN1760**Proper Shipping Name:** Corrosive liquid, n.o.s. (Acetic acid, Ammonium fluoride)**Class:** 8**Packing Group:** II**Label(s):** Corrosive**IMDG****UN No.:** UN1760**Proper Shipping Name:** Corrosive liquids, n.o.s. (Acetic acid, Ammonium fluoride)**Class:** 8**Packing Group:** II**EmS No.:** F-A, S-B**15 REGULATORY INFORMATION**

Canadian Controlled Products Regulations: This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS Classification: D1B, E

Mexican Dangerous Statement: This product is dangerous according to Mexican regulations.

Inventory Status: All ingredients are listed on TSCA.

TSCA

TSCA Section 4(a) Final Test Rules & Testing Consent Orders: Not regulated.

TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated.

TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.

US Regulations**CERCLA Hazardous Substance List (40 CFR 302.4):**

Chemical Name	RQ
Acetic acid	5000 lbs
Ammonium fluoride	100 lbs
Ethylene glycol	5000 lbs

SARA Title III

Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated.

Section 311/312 (40 CFR 370):

☒ Acute (Immediate) ☒ Chronic (Delayed) ☐ Fire ☐ Reactive ☐ Pressure Generating

Section 313 Toxic Release Inventory (40 CFR 372):

Chemical Name	CAS-No.	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Ethylene glycol	107-21-1	10000 lbs	25000 lbs

For reporting purposes: the De Minimis Concentration for a toxic chemical in a mixture is 0.1% for carcinogens as defined in 29 CFR 1910.1200(d)(4) or 1% for others.

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

Not regulated.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Ammonium fluoride; Acetic acid

Drug Enforcement Act: None. Not regulated.

State Regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Not regulated.

Massachusetts Right-To-Know List: Acetic acid; Ammonium fluoride; Ethylene glycol

Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Not regulated.

Minnesota Hazardous Substances List: Acetic acid; Ammonium fluoride; Ethylene glycol

New Jersey Right-To-Know List: Acetic acid; Ammonium fluoride; Ethylene glycol

Pennsylvania Right-To-Know List: Acetic acid; Ammonium fluoride; Ethylene glycol

Rhode Island Right-To-Know List: Acetic acid; Ammonium fluoride; Ethylene glycol

16 OTHER INFORMATION**HAZARD RATINGS**

National Fire Protection Association	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	NONE	NONE	NONE	NONE

Hazardous Materials Information System	Health Hazard	Flammability	Physical Hazard	Other
HMIS	3*	1	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe *- Chronic Health Effect

MSDS file: 10851_NA_EN_V1.0

Replaces file: 00851

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Supersedes Date:

Disclaimer: THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200 AND THE CANADIAN CONTROLLED PRODUCT REGULATION (SOR/88-66). THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. FUJIFILM ELECTRONIC MATERIALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT FUJIFILM ELECTRONIC MATERIALS AT THE PHONE NUMBER 1-800-553-6546 (CUSTOMER SERVICE) TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT.