

Safety Data Sheet

**Section 1: Identification of the Substance/Mixture and of the Company/Undertaking****1.1 Product identifier**

Product Name | **Ammonium Fluoride 40%, Water (Balance)**
Synonyms | Ammonium fluoride solution; Neutral ammonium fluoride solution
Product Code | 80117 AL-E

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s) | Semiconductor manufacturing

1.3 Details of the supplier of the safety data sheet

Manufacturer | Air Liquide
2700 Post Oak Blvd.
Houston, TX 77056
United States
www.us.airliquide.com
sds@airliquide.com
Telephone (Technical) | 713-896-2896
Telephone (Technical) | 800-819-1704

1.4 Emergency telephone number

Manufacturer | 800-424-9300 - CHEMTREC
Manufacturer | +1 703-527-3887 - Outside United States

Section 2: Hazards Identification**EU/EEC**

According to Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP | Acute Toxicity Oral 3 - H301
Acute Toxicity Dermal 3 - H311
Acute Toxicity Inhalation 3 - H331
DSD/DPD | Toxic (T)
R23/24/25

2.2 Label Elements

CLP

DANGER



Hazard statements | H301 - Toxic if swallowed
H311 - Toxic in contact with skin
H331 - Toxic if inhaled

Precautionary statements

Prevention | P261 - Avoid breathing mist/vapours/spray.
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 and clothing .

Response | P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P321 - Specific treatment, see supplemental first aid information.
P311 - Call a POISON CENTER or doctor/physician.
P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
P322 - Specific measures, see supplemental first aid information.
P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
P361 - Remove/Take off immediately all contaminated clothing.
P363 - Wash contaminated clothing before reuse.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P330 - Rinse mouth.

Storage/Disposal | P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



Risk phrases | R23/24/25 - Toxic by inhalation, in contact with skin and if swallowed.

Safety phrases | S27 - Take off immediately all contaminated clothing.
S36 - Wear suitable protective clothing.
S37 - Wear suitable gloves.
S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

2.3 Other Hazards

CLP | According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

DSD/DPD | This product is considered dangerous according to the European Directive 67/548/EEC.

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012 | Acute Toxicity Oral 3 - H301
Acute Toxicity Dermal 3 - H311
Acute Toxicity Inhalation 3 - H331

2.2 Label elements

OSHA HCS 2012

DANGER



Hazard statements | Toxic if swallowed - H301

Toxic in contact with skin - H311

Toxic if inhaled - H331

Precautionary statements

- Prevention** | Avoid breathing mist/vapours/spray. - P261
 Wash thoroughly after handling. - P264
 Do not eat, drink or smoke when using this product. - P270
 Use only outdoors or in a well-ventilated area. - P271
 Wear protective gloves and eye/face protection , . - P280
- Response** | IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340
 Call a POISON CENTER or doctor/physician. - P311
 If on skin: Wash with plenty of water .
 Call a POISON CENTER or doctor/physician if you feel unwell. - P312
 Specific treatment, see supplemental first aid information. - P321
 Take off immediately all contaminated clothing and wash it before reuse.
 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. - P301+P310
 Rinse mouth. - P330
- Storage/Disposal** | Store in a well-ventilated place. Keep container tightly closed. - P403+P233
 Store locked up. - P405
 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

2.3 Other hazards**OSHA HCS 2012**

- | Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada**According to WHMIS****2.1 Classification of the substance or mixture****WHMIS**

- | Toxic - D1B
 Other Toxic Effects - D2A

2.2 Label elements**WHMIS**

- | Toxic - D1B
 Other Toxic Effects - D2A

2.3 Other hazards**WHMIS**

- | In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

2.4 Other information**NFPA**

Section 3 - Composition/Information on Ingredients

3.1 Substances

Composition			
Chemical Name	Identifiers	%	Classifications According to Regulation/Directive
Water	CAS:7732-18-5 EC Number:231-791-2 EINECS:231-791-2	60%	EU DSD/DPD: Not Classified EU CLP: Not Classified OSHA HCS 2012: Not Classified
Ammonium fluoride	CAS:12125-01-8 EC Number:235-185-9 EU Index:009-006-00-8	40%	EU DSD/DPD: Annex VI, Table 3.2 - T; R23/24/25 EU CLP: Annex VI, Table 3.1 - Acute Tox 3, H331, H311, H301 OSHA HCS 2012: Acute Tox. 3 (oral, inh, skin)

3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

Section 4 - First Aid Measures

4.1 Description of first aid measures

- Inhalation**
- Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention immediately.
- Skin**
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Remove and isolate contaminated clothing. Get medical attention immediately.
- Eye**
- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye.
- Ingestion**
- Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

- Suitable Extinguishing Media**
- LARGE FIRES: Dry chemical, CO₂, alcohol-resistant foam or water spray.
 - SMALL FIRES: Dry chemical, CO₂ or water spray.
- Unsuitable Extinguishing Media**
- No data available

5.2 Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards**
- Not considered a fire hazard. If involved in a fire, can emit toxic fumes and irritating and corrosive gases.
 - May react with metals to form flammable hydrogen gas.

Hazardous Combustion Products

- When involved in a fire, this material may decompose and produce irritating vapors, and toxic gases (e.g., fluorine and other fluoride compounds, ammonia compounds).

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
Wear positive pressure self-contained breathing apparatus (SCBA).
SMALL FIRES: Move containers from fire area if you can do it without risk.

Section 6 - Accidental Release Measures**6.1 Personal precautions, protective equipment and emergency procedures****Personal Precautions**

- Ventilate enclosed areas. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Emergency Procedures

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Do not get water inside container.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

6.3 Methods and material for containment and cleaning up**Containment/Clean-up Measures**

- Flush spill with plenty of water and neutralize with alkaline material such as soda ash, lime, etc. Provide adequate personal protective equipment and ventilation to eliminate oxides of nitrogen and chlorine, and any carbon dioxide gas from use of soda ash or limestone.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Dike to collect large liquid spills.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage**7.1 Precautions for safe handling****Handling**

- Handle and open container with care. Use only with adequate ventilation. Wear appropriate personal protective equipment, avoid direct contact. Avoid breathing mist/vapors/spray. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities**Storage**

- Keep container tightly closed. Store in a cool, dry, well-ventilated place. Keep away from incompatible materials. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection**8.1 Control parameters**

Exposure Limits/Guidelines | Currently there are no applicable exposure limits established for this material.

8.2 Exposure controls

Engineering Measures/Controls | Good general ventilation 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.

Personal Protective Equipment

Respiratory | Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face | Wear chemical splash safety goggles.

Skin/Body | Wear appropriate gloves.

Environmental Exposure Controls | Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Liquid	Appearance/Description	Clear, colorless liquid with a slight characteristic odor.
Color	Clear, colorless.	Odor	Slight characteristic.
Odor Threshold	Data lacking		
General Properties			
Boiling Point	100 C(212 F)	Melting Point	-4 C(24.8 F)
Decomposition Temperature	Data lacking	pH	6 to 7
Specific Gravity/Relative Density	1.11 Water=1	Water Solubility	Miscible
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

| No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

| No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

| Stable

10.3 Possibility of hazardous reactions

| Hazardous polymerization will not occur.

10.4 Conditions to avoid

| Heat, incompatibles.

10.5 Incompatible materials

| Reaction with strong acids to produce hazardous HF gas or hydrofluoric acid, with strong bases to yield ammonia. Avoid strong oxidizing agents. Corrodes glass and metals.

10.6 Hazardous decomposition products

| Emits toxic fumes of hydrogen fluoride, nitric oxides, and ammonia when heated to decomposition.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

GHS Properties	Classification
Acute toxicity	EU/CLP • Acute Toxicity - Dermal 3 - ATEmix(dermal) = 750 mg/kg; Acute Toxicity - Inhalation 3 - ATEmix(inhl) = 7.5 mg/L; Acute Toxicity - Oral 3 - ATEmix(oral) = 250mg/kg OSHA HCS 2012 • Acute Toxicity - Dermal 3 - ATEmix(dermal) = 750 mg/kg; Acute Toxicity - Inhalation 3 - ATEmix(inhl) = 7.5 mg/L; Acute Toxicity - Oral 3 - ATEmix(oral) = 250mg/kg
Aspiration Hazard	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Carcinogenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Germ Cell Mutagenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Skin corrosion/Irritation	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Skin sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
STOT-RE	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
STOT-SE	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Toxicity for Reproduction	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Respiratory sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Serious eye damage/Irritation	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking

Potential Health Effects

Inhalation

Acute (Immediate) | Harmful if inhaled.

Chronic (Delayed) | No data available

Skin

Acute (Immediate) | Toxic in contact with skin.

Chronic (Delayed) | No data available

Eye

Acute (Immediate) | No data available

Chronic (Delayed) | No data available

Ingestion

Acute (Immediate) | Toxic if swallowed.

Chronic (Delayed) | No data available

Section 12 - Ecological Information**12.1 Toxicity**

| Material data lacking.

12.2 Persistence and degradability

| Material data lacking.

12.3 Bioaccumulative potential

| Material data lacking.

12.4 Mobility in Soil

| Material data lacking.

12.5 Results of PBT and vPvB assessment

| No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

| No studies have been found.

Section 13 - Disposal Considerations**13.1 Waste treatment methods**

Product waste | Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste | Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN2505	Ammonium fluoride	6.1	III	NDA
TDG	UN2505	AMMONIUM FLUORIDE	6.1	III	NDA

IMO/MDG	UN2505	AMMONIUM FLUORIDE	6.1	III	NDA
IATA/ICAO	UN2505	Ammonium Fluoride	6.1	III	NDA

14.6 Special precautions for user | None known.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | Not relevant.

Section 15 - Regulatory Information

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

SARA Hazard Classifications | Acute

State Right To Know				
Component	CAS	MA	NJ	PA
Ammonium fluoride	12125-01-8	Yes	Yes	Yes
Water	7732-18-5	No	No	No

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Ammonium fluoride	12125-01-8	Yes	No	Yes	No	Yes
Water	7732-18-5	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Ammonium fluoride	12125-01-8	D1B, D2A
• Water	7732-18-5	Uncontrolled product according to WHMIS classification criteria

Canada - WHMIS - Ingredient Disclosure List

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Environment

Canada - CEPA - Priority Substances List

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

• Ammonium fluoride	12125-01-8	T; R23/24/25
• Water	7732-18-5	Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

• Ammonium fluoride	12125-01-8	Not Listed
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• Water	7732-18-5	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling		
• Ammonium fluoride	12125-01-8	T R:23/24/25 S:(1/2)-26-45
• Water	7732-18-5	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases		
• Ammonium fluoride	12125-01-8	S:(1/2)-26-45
• Water	7732-18-5	Not Listed

Germany

Environment

Germany - TA Luft - Types and Classes

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Germany - Water Classification (VwVwS) - Annex 1

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

• Ammonium fluoride	12125-01-8	ID Number 291, hazard class 1 - low hazard to waters
• Water	7732-18-5	Not Listed

Germany - Water Classification (VwVwS) - Annex 3

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Portugal

Other

Portugal - Prohibited Substances

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Other

United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review

• Ammonium fluoride	12125-01-8	Not Listed
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• Water	7732-18-5	Not Listed
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United Kingdom - List of Dangerous Substances in Water

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

United States**Labor****U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals**

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

Environment**U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants**

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Ammonium fluoride	12125-01-8	100 lb final RQ; 45.4 kg final RQ
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

U.S. - EPA - Designated Generic Categories - Aqueous Ammonia

• Ammonium fluoride	12125-01-8	NH3 Equiv. Wt. % = 45.98
• Water	7732-18-5	Not Listed

United States - California**Environment****U.S. - California - Proposition 65 - Carcinogens List**

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
U.S. - California - Proposition 65 - Developmental Toxicity		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

• Ammonium fluoride	12125-01-8	
• Water	7732-18-5	Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

• Ammonium fluoride	12125-01-8	Not Listed
• Water	7732-18-5	Not Listed

15.2 Chemical Safety Assessment

| No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date | 02/January/2015

Preparation Date | 02/January/2015

Disclaimer/Statement of Liability | To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Key to abbreviations

NDA = No data available