1. Product and Company Identification

Material name: AMMONIUM FLUORIDE 40% SOLUTION
Version #: 06
Revision date: 03-26-2012
CAS #: Mixture
Product Codes:
- J.T.Baker: 0702, 0712, 5864, 5874
- Macron: 37816
Synonym(s):
- Ammonium fluoride solution; neutral ammonium fluoride solution
Manufacturer Address:
Avantor Performance Materials, Inc.
3477 Corporate Parkway
Suite #200
Center Valley, PA 18034
US
Customer Service: 855-282-6867
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazards Identification

Emergency overview:
DANGER
Harmful if inhaled, absorbed through skin, or swallowed. Irritating to eyes and skin. Mist or vapor irritating to eyes and respiratory tract. Causes blood, cardiovascular system and respiratory system damage. Prolonged exposure may cause chronic effects.

OSHA regulatory status:
This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:
- Routes of exposure: Ingestion. Inhalation. Skin contact. Eye contact.
- Eyes: Causes eye irritation.
- Skin: Harmful if absorbed through skin. Causes skin irritation.
- Inhalation: Harmful if inhaled. Vapors irritate the respiratory system, and may cause coughing and difficulties in breathing.
- Ingestion: Harmful if swallowed. Ingestion can cause gastrointestinal irritation, nausea, vomiting and diarrhea.
- Chronic effects: Intake of more than 6 mg of fluorine per day may result in fluorosis, bone and joint damage. Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream. Symptoms may be delayed.

Potential environmental effects:
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

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMMONIUM FLUORIDE</td>
<td>12125-01-8</td>
<td>40</td>
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<table>
<thead>
<tr>
<th>Non-hazardous components</th>
<th>CAS #</th>
<th>Percent</th>
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<tbody>
<tr>
<td>WATER</td>
<td>7732-18-5</td>
<td>60</td>
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</tbody>
</table>
4. First Aid Measures

First aid procedures

Eye contact
Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact
Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.

Inhalation
Move to fresh air. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen. Call a physician or poison control center immediately.

Ingestion
Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs.

Notes to physician
Keep victim under observation. Appropriate treatment to help protect the affected person against circulatory shock, respiratory depression, and convulsion may be needed. Symptoms may be delayed.

General advice
In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties
Not flammable, but reacts with most metals to form flammable hydrogen gas.

Extinguishing media
Water spray. Carbon dioxide (CO2). Dry chemical powder. Foam.

Protection of firefighters
Fire may produce irritating, corrosive and/or toxic gases.

Specific hazards arising from the chemical

Specific methods
In the event of fire and/or explosion do not breathe fumes. Cool containers exposed to flames with water until well after the fire is out.

6. Accidental Release Measures

Personal precautions
Wear appropriate protective equipment and clothing during clean-up. Keep unnecessary personnel away. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not discharge into drains, water courses or onto the ground.

Methods for containment
Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up
Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Dike far ahead of spill for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Collect in a non-combustible container for prompt disposal.

Never return spills in original containers for re-use. Clean surface thoroughly to remove residual contamination. Clean up in accordance with all applicable regulations.
7. Handling and Storage

Handling
Wear appropriate personal protective equipment. Do not get in eyes, on skin, on clothing. Do not breathe mist or vapor. Do not taste or swallow. Do not eat, drink or smoke when using the product. Use only with adequate ventilation. Wash thoroughly after handling. See Section 8 of the MSDS for Personal Protective Equipment.

Storage
Do not store in metal containers. Will attack glass and most ceramics. Keep tightly closed in a dry, cool and well-ventilated place.

8. Exposure Controls / Personal Protection

ACGIH

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
<th>Value</th>
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<tr>
<td>AMMONIUM FLUORIDE (12125-01-8)</td>
<td>BEL</td>
<td>3.0000 mg/g</td>
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<tr>
<td></td>
<td></td>
<td>10.0000 mg/g</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2.5000 mg/m3</td>
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</table>

Occupational exposure limits

<table>
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<tr>
<th>U.S. - OSHA Components</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
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<td></td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>2.5000 mg/m3</td>
<td>Dust.</td>
</tr>
</tbody>
</table>

Engineering controls
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.

Personal protective equipment

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

Skin protection
Wear appropriate chemical resistant 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 specific cartridge and full facepiece providing protection against the compound of concern.

General hygiene considerations
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 and protective equipment to remove contaminants.

General
Wear chemical protective equipment that is specifically recommended by the manufacturer. Launder contaminated clothing before reuse.

9. Physical & Chemical Properties

Appearance
Clear.

Color
Colorless.

Odor
Slight.

Odor threshold
Not available.

Physical state
Liquid.

Form
Liquid.

pH
Not available.

Melting point
-22 °F (-30 °C)

Boiling point
228.2 °F (109 °C)

Flash point
Not available.

Evaporation rate
Not available.
Flammability limits in air, upper, % by volume: Not available.
Flammability limits in air, lower, % by volume: Not available.
Relative density: Not available.
Solubility (water): Miscible
Partition coefficient (n-octanol/water): Not available
Auto-ignition temperature: Not available.
Decomposition temperature: Not available.
Molecular formula: NH₄F (40% in H₂O)

10. Chemical Stability & Reactivity Information

Chemical stability: Stable under normal temperature conditions.
Conditions to avoid: Excessive heat.
Possibility of hazardous reactions: Hazardous polymerization does not occur.

11. Toxicological Information

Sensitization: Not a skin sensitizer.
Acute effects: Harmful if inhaled, absorbed through skin, or swallowed.
Local effects: Causes skin and eye irritation. Mist or vapor irritating to eyes and respiratory tract. Causes blood, cardiovascular system and respiratory system damage.
Chronic effects: Intake of more than 6 mg of fluorine per day may result in fluorosis, bone and joint damage. Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream. Symptoms may be delayed.
Carcinogenicity: This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens
AMMONIUM FLUORIDE (CAS 12125-01-8) A4 Not classifiable as a human carcinogen.
IARC Monographs. Overall Evaluation of Carcinogenicity
AMMONIUM FLUORIDE (CAS 12125-01-8) 3 Not classifiable as to carcinogenicity to humans.

Skin corrosion/irritation: Causes skin irritation. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone. Symptoms may develop after several hours.
Epidemiology: No epidemiological data is available for this product.
Mutagenicity: No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Neurological effects: No data available for this product.
Reproductive effects: Contains no ingredient listed as toxic to reproduction.
Teratogenicity: No data available for this product.
Further information: Danger of very serious irreversible effects. Symptoms may be delayed.

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.
Environmental effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability

Expected to be readily biodegradable.

Partition coefficient (n-octanol/water)

Not available

13. Disposal Considerations

Disposal instructions

Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations.

Contaminated packaging

Since emptied containers retain product residue, follow label warnings even after container is emptied. Offer rinsed packaging material to local recycling facilities.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN3287
Proper shipping name Toxic liquid, inorganic, n.o.s. (AMMONIUM FLUORIDE)
Hazard class 6.1
Packing group III
Additional information:
Special provisions IB3, T7, TP1, TP28

Basic shipping requirements:

Labels required 6.1
Additional information:
Packaging exceptions 153
Packaging non bulk 203
Packaging bulk 241
ERG number 151

IATA

Basic shipping requirements:

UN number 3287
Proper shipping name Toxic liquid, inorganic, n.o.s. (AMMONIUM FLUORIDE)
Hazard class 6.1
Packing group III
Additional information:
ERG code 6L

IMDG

Basic shipping requirements:

UN number 3287
Proper shipping name TOXIC LIQUID, INORGANIC, N.O.S. (AMMONIUM FLUORIDE)
Hazard class 6.1
Packing group III
15. Regulatory Information

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

AMMONIUM FLUORIDE (CAS 12125-01-8) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

AMMONIUM FLUORIDE (CAS 12125-01-8) Listed.

CERCLA (Superfund) reportable quantity

AMMONIUM FLUORIDE: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 311 hazardous chemical
Yes

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
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<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
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<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
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<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
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<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
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<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
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<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
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<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

AMMONIUM FLUORIDE (CAS 12125-01-8) Listed.

Saf-T-Data

Health: 2 - Moderate (Poison)
Flammability: 0 - None
Reactivity: 1 - Slight
Contact: 3 - Severe
Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: B - Blue (Health)

16. Labeling Info

Label Hazard Warning

DANGER

Harmful if inhaled, absorbed through skin, or swallowed. Irritating to eyes and skin. Mist or vapor irritating to eyes and respiratory tract. Causes blood, cardiovascular system and respiratory system damage. Prolonged exposure may cause chronic effects.
Label Precautions
Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Label First Aid
Immediately flush eyes with plenty of water for at least 15 minutes. Immediately flush skin with plenty of water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Oxygen or artificial respiration if needed. Call a physician or poison control center immediately. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. 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.

17. Other Information

NFPA ratings
Health: 3
Flammability: 0
Instability: 0

Disclaimer
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