

NH4F 40%, XLSI-C, Bulk

Version 1

Revision Date 03/09/2012

Print Date 05/02/2014

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Ammonium Fluoride 40%
MSDS Number : 000000011789
Product Use Description : Semiconductor Production

Company : Honeywell International, Inc.
101 Columbia Road
Morristown, NJ 07962-1057

For more information call : 1-800-279-9998
(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-651-523-0309**
Transportation: 1-800-424-9300 or +1-703-527-3887
(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : liquid, clear
Color : colourless
Odor : slight ammoniacal
Hazard Summary : Toxic. May be fatal if inhaled. May be fatal if swallowed.
Irritating to eyes, respiratory system and skin. Can be absorbed through skin. Symptoms may be delayed.

Potential Health Effects

Skin : Causes severe skin irritation.
May cause burns or external ulcers.
The product may be absorbed through the skin.
Symptoms may be delayed.
Eyes : Irritating to eyes.
May cause irreversible eye damage.
Ingestion : May be fatal if swallowed.
May cause nausea, vomiting, diarrhea, and abdominal discomfort.
May cause:
Abdominal pain

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- Weakness
Tremors
Convulsions
Coma
Respiratory failure
May adversely affect the:
Heart
Cardio-vascular system
May cause damage to the following:
Central Nervous System
Kidney
- Inhalation : May be fatal if inhaled.
Irritating to respiratory system.
Causes burns.
May cause:
Shortness of breath
Cough
sore throat
Symptoms may be delayed.
- Chronic Exposure : Can cause bone and joint changes in humans (fluorosis).
May cause gastric irritation.
May cause convulsions.
May cause:
Cardiac irregularities

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | CAS-No. | Concentration |
|-------------------|------------|-----------------|
| Water | 7732-18-5 | 59.00 - 61.00 % |
| Ammonium fluoride | 12125-01-8 | 39.00 - 41.00 % |

SECTION 4. FIRST AID MEASURES

- Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician immediately.

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- Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician immediately.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.
- Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. If victim is fully conscious, give a cupful of water. Call a physician immediately.

Notes to physician

- Treatment : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Flash point : closed cup
does not flash
- Lower explosion limit : not applicable
- Upper explosion limit : not applicable
- Suitable extinguishing media : Water spray
Foam
Carbon dioxide (CO₂)
Dry chemical
- Specific hazards during firefighting : Some risk may be expected of corrosive and toxic decomposition products.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Ammonia
nitrogen oxides
- Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.
- Additional advice : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Wear personal protective equipment.

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Immediately evacuate personnel to safe areas.
 Keep people away from and upwind of spill/leak.
 Eliminate all ignition sources if safe to do so.
 Provide adequate ventilation.
 Do not swallow.
 Do not breathe vapours or spray mist.
 Do not get in eyes, on skin, or on clothing.

Environmental precautions : Prevent further leakage or spillage if safe to do so.
 Do not let product enter drains.
 Do not flush into surface water or sanitary sewer system.
 Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Methods for cleaning up : Ventilate the area.
 Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE**Handling**

Handling : Wear personal protective equipment.
 Keep container tightly closed.
 Use only in well-ventilated areas.
 Do not swallow.
 Do not breathe vapours or spray mist.
 Do not get in eyes, on skin, or on clothing.

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Storage

Requirements for storage areas and containers : Keep containers tightly closed in a dry, cool and well-ventilated place.
 Containers which are opened must be carefully resealed and kept upright to prevent leakage.
 Store away from incompatible substances.
 Protect from physical damage.

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Protective measures : Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : Use in a chemical fume hood
- Eye protection : Goggles or face shield, giving complete protection to eyes
- Hand protection : Protective gloves
Rubber gloves
Nitrile rubber
Neoprene gloves
Gloves must be inspected prior to use.
Replace when worn.
- Skin and body protection : Protective suit
- Respiratory protection : Full mask
In case of insufficient ventilation wear suitable respiratory equipment.
Use NIOSH approved respiratory protection.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.
Contaminated work clothing should not be allowed out of the workplace.
When using do not eat, drink or smoke.
Do not swallow.
Do not breathe vapours or spray mist.
Do not get in eyes, on skin, or on clothing.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.
Contaminated work clothing should not be allowed out of the workplace.
When using do not eat, drink or smoke.
Do not swallow.
Do not breathe vapours or spray mist.
Do not get in eyes, on skin, or on clothing.

Exposure Guidelines

| | | | | |
|-------------------|------------|-------|-----|-----------------------|
| Ammonium fluoride | 12125-01-8 | ACGIH | TWA | 2.5 mg/m ³ |
|-------------------|------------|-------|-----|-----------------------|

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| | | | |
|----------|------------------|-------|-----------|
| | Expressed as | as F | |
| NIOSH | REL | | 2.5 mg/m3 |
| | Expressed as | as F | |
| OSHA Z1 | PEL | | 2.5 mg/m3 |
| | Expressed as | as F | |
| OSHA Z1A | TWA | | 2.5 mg/m3 |
| | Expressed as | as F | |
| OSHA Z2 | TWA | | 2.5 mg/m3 |
| | Form of exposure | Dust. | |

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|-----------------------------|------------------------------|
| Form | : liquid, clear |
| Color | : colourless |
| Odor | : slight ammoniacal |
| Molecular Weight | : 37.04 g/mol |
| pH | : 6.2 |
| Melting point/range | : Decomposes before melting. |
| Boiling point/boiling range | : 149 °C (300 °F) |
| Vapor pressure | : not determined |
| Relative vapour density | : 1.3 (Air = 1.0) |
| Density | : 1.015 g/cm3 |
| Water solubility | : completely soluble |

SECTION 10. STABILITY AND REACTIVITY

| | |
|---------------------|--|
| Conditions to avoid | : Keep away from heat. |
| Materials to avoid | : Potassium chlorate Nitrates Chlorine trifluoride |

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Calcium

Glass and silicate-containing materials are attacked.

Contact with strong acids liberates hydrogen fluoride.

Contact with strong bases liberates ammonia.

Hazardous decomposition products : In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Ammonia
nitrogen oxides

Hazardous reactions : Hazardous polymerisation does not occur.
Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity : LD50: 200 mg/kg
Species: rat

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

Toxicity to fish : LC50: 364 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)
Note: Information refers to the main component.

Further information on ecology**SECTION 13. DISPOSAL CONSIDERATIONS**

Waste Information: Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT UN/ID No. : UN 3287
Proper shipping name : TOXIC LIQUID, INORGANIC, N.O.S.
(Ammonium fluoride, Solution)

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| | |
|---------------|-----|
| Class | 6.1 |
| Packing group | III |
| Hazard Labels | 6.1 |

| | | |
|-------------|--|--|
| IATA | UN/ID No. | : UN 3287 |
| | Description of the goods | : TOXIC LIQUID, INORGANIC, N.O.S. (Ammonium fluoride, Solution) |
| | Class | : 6.1 |
| | Packaging group | : III |
| | Hazard Labels | : 6.1 |
| | Packing instruction (cargo aircraft) | : 663 |
| | Packing instruction (passenger aircraft) | : 655 |
| | Packing instruction (passenger aircraft) | : Y642 |

| | | |
|-------------|--------------------------|--|
| IMDG | UN/ID No. | : UN 3287 |
| | Description of the goods | : TOXIC LIQUID, INORGANIC, N.O.S. (AMMONIUM FLUORIDE, SOLUTION) |
| | Class | : 6.1 |
| | Packaging group | : III |
| | Hazard Labels | : 6.1 |
| | EmS Number | : F-A |
| | Marine pollutant | : no |

SECTION 15. REGULATORY INFORMATION
Inventories

| | |
|---|--|
| 1907/2006 (EU) | : This mixture contains only ingredients which have been subject to a pre-registration according to Regulation (EC) No. 1907/2006 (REACH). |
| US. Toxic Substances Control Act | : On TSCA Inventory |
| Australia. Industrial Chemical (Notification and Assessment) Act | : On the inventory, or in compliance with the inventory |
| Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 144) | : All components of this product are on the Canadian DSL list. |
| Japan. Kashin-Hou Law List | : On the inventory, or in compliance with the inventory |

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Korea. Existing Chemicals Inventory (KECI) : On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

SARA 313 Components : Ammonium fluoride 12125-01-8

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

CERCLA Reportable Quantity : 244 lbs

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

Massachusetts RTK : Ammonium fluoride 12125-01-8

New Jersey RTK : Ammonium fluoride 12125-01-8

Pennsylvania RTK : Ammonium fluoride 12125-01-8

WHMIS Classification : D1B
D2A
This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

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SECTION 16. OTHER INFORMATION

| | HMIS III | NFPA |
|-----------------|-----------------|-------------|
| Health hazard | : 3* | 3 |
| Flammability | : 0 | 0 |
| Physical Hazard | : 0 | |
| Instability | : | 0 |

* - Chronic health hazard