1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: AMMONIUM BIFLUORIDE

Other name(s): Ammonium hydrogen fluoride; Ammonium acid fluoride; Ammonium difluoride;
Ammonium hydrogen difluoride; Ammonium bifluoride; Ammonium hydrofluoride.

Recommended use of the chemical and restrictions on use: Biocide.

Supplier: Orica Australia Pty Ltd
ABN: 99 004 117 828
Street Address: 1 Nicholson Street, Melbourne 3000 Australia

Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937
Emergency Telephone: 1 800 033 111 (ALL HOURS)

2. HAZARDS IDENTIFICATION

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

SIGNAL WORD: DANGEROUS POISON

Poisons Schedule (SUSMP): S7 Dangerous Poison.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Proportion</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium bifluoride</td>
<td>1341-49-7</td>
<td>&gt;=98%</td>
<td>H301 H314</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor at once.

Inhalation:
Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discolouration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact:
If spill on large areas of skin or hair, immediately drench with running water and remove clothing. Continue to wash skin and hair with plenty of water (and soap if material is insoluble) until advised to stop by the Poisons Information Centre or a doctor. For skin burns, cover with a clean, dry dressing until medical help is available.
Eye Contact:
Immediately wash in and around the eye area with large amounts of water for at least 15 minutes. Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport promptly to hospital or medical centre.

Ingestion:
Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

Indication of immediate medical attention and special treatment needed:
Treat symptomatically. Can cause corneal burns.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Not combustible, however, if material is involved in a fire use: Fine water spray, normal foam, dry agent (carbon dioxide, dry chemical powder).

Hazchem or Emergency Action Code: 2X

Specific hazards arising from the substance or mixture:
Non-combustible material.

Special protective equipment and precautions for fire-fighters:
Decomposes on heating emitting toxic fumes, including those of ammonia, and hydrogen fluoride. Fire fighters to wear self-contained breathing apparatus and suitable protective clothing if risk of exposure to products of decomposition.

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures/Environmental precautions:
Clear area of all unprotected personnel. If contamination of sewers or waterways has occurred advise local emergency services.

Personal precautions/Protective equipment/Methods and materials for containment and cleaning up:
Wear protective equipment to prevent skin and eye contact and breathing in dust. Work up wind or increase ventilation. Cover with damp absorbent (inert material, sand or soil). Sweep or vacuum up, but avoid generating dust. Collect and seal in properly labelled containers or drums for disposal.

7. HANDLING AND STORAGE

This material is a Scheduled Poison S7 and must be stored, maintained and used in accordance with the relevant regulations.

Precautions for safe handling:
Avoid skin and eye contact and breathing in dust. Keep out of reach of children. Obtain a supply of calcium gluconate gel. Wear eye protection when mixing or using. Wear protective gloves when mixing or using. Wash gloves thoroughly, immediately after use.

Conditions for safe storage, including any incompatibilities:
Store in a cool, dry, well ventilated place and out of direct sunlight. Protect from moisture. Store away from foodstuffs. Store away from incompatible materials described in Section 10. Keep containers closed when not in use - check regularly for spills.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Control Parameters: No value assigned for this specific material by Safe Work Australia. However, Workplace Exposure Standard(s) for constituent(s):

Fluorides (as F): 8hr TWA = 2.5 mg/m³

As published by Safe Work Australia Workplace Exposure Standards for Airborne Contaminants.

TWA - The time-weighted average airborne concentration of a particular substance when calculated over an eight-hour working day, for a five-day working week.

These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Appropriate engineering controls:
Ensure ventilation is adequate and that air concentrations of components are controlled below quoted Workplace Exposure Standards. Avoid generating and breathing in dusts. Use with local exhaust ventilation or while wearing dust mask. Keep containers closed when not in use.

Individual protection measures, such as Personal Protective Equipment (PPE):
The selection of PPE is dependent on a detailed risk assessment. The risk assessment should consider the work situation, the physical form of the chemical, the handling methods, and environmental factors.

Orica Personal Protection Guide No. 1, 1998: F - OVERALLS, SAFETY SHOES, CHEMICAL GOGGLES, GLOVES, DUST MASK.

Wear overalls, chemical goggles and impervious gloves. Avoid generating and inhaling dusts. If determined by a risk assessment an inhalation risk exists, wear a dust mask/respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
</tr>
<tr>
<td>Colour</td>
<td>White</td>
</tr>
<tr>
<td>Odour</td>
<td>Slightly Pungent</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>F₂H₅N</td>
</tr>
<tr>
<td>Solubility</td>
<td>Soluble in water.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.50</td>
</tr>
<tr>
<td>Relative Vapour Density (air=1)</td>
<td>Not available.</td>
</tr>
<tr>
<td>Vapour Pressure (20 °C)</td>
<td>1 hPa</td>
</tr>
<tr>
<td>Flash Point (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammability Limits (%)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Autoignition Temperature (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Solubility in water (g/L)</td>
<td>630 @20°C</td>
</tr>
</tbody>
</table>

Product Name: AMMONIUM BIFLUORIDE
Substance No: 000031001801

Issued: 16/10/2009
Version: 4
10. STABILITY AND REACTIVITY

Chemical stability: The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Possibility of hazardous reactions: Ammonium bifluoride is decomposed by heat or acids, evolving hydrogen fluoride, a toxic, extremely irritating and corrosive gas, apparent as white fumes; in the presence of moisture, it is highly corrosive to glass, other siliceous materials and most metals.

Conditions to avoid: Avoid dust generation. Avoid exposure to moisture.

Incompatible materials: Incompatible with acids, bases, glass, metals, and moisture.


11. TOXICOLOGICAL INFORMATION

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract.

Eye contact: A severe eye irritant. Corrosive to eyes; contact can cause corneal burns. Contamination of eyes can result in permanent injury. Contact with eyes even for short periods can cause blindness.

Skin contact: Causes severe burns, which are not likely to be immediately painful or visible.

Inhalation: Breathing in dust may result in respiratory irritation.

Acute toxicity: Oral LD50 (rat): 60-130 mg/kg. Oral LD50 (guinea pig): 150 mg/kg.

Chronic effects: Chronic fluorine poisoning is possible.

12. ECOLOGICAL INFORMATION

Ecotoxicity: Avoid contaminating waterways.

Aquatic toxicity: Harmful to aquatic organisms.

96hr LC50 (fish): 51 mg/L (fluorides) (Salmo gairdneri)

13. DISPOSAL CONSIDERATIONS
14. TRANSPORT INFORMATION

Road and Rail Transport
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail; DANGEROUS GOODS.

UN No: 1727
Transport Hazard Class: 8 Corrosive
Packing Group: II
Proper Shipping Name or Technical Name: AMMONIUM HYDROGENDIFLUORIDE, SOLID

Hazchem or Emergency Action Code: 2X

Marine Transport
Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 1727
Transport Hazard Class: 8 Corrosive
Packing Group: II
Proper Shipping Name or Technical Name: AMMONIUM HYDROGENDIFLUORIDE, SOLID

IMDG EMS Fire: F-A
IMDG EMS Spill: S-B

Air Transport
Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS.

UN No: 1727
Transport Hazard Class: 8 Corrosive
Packing Group: II
Proper Shipping Name or Technical Name: AMMONIUM HYDROGENDIFLUORIDE, SOLID

15. REGULATORY INFORMATION

Classification:
This material is hazardous according to Safe Work Australia; HAZARDOUS SUBSTANCE.

Poisons Schedule (SUSMP): S7 Dangerous Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Product Name: AMMONIUM BIFLUORIDE
Substance No: 000031001801
Issued: 16/10/2009
Version: 4
Safety Data Sheet

Supplier Safety Data Sheet; 11/2003.

This safety data sheet has been prepared by Orica Toxicology & SDS Services.

Reason(s) for Issue:
5 Yearly Revised Primary SDS
Alignment to HSNO requirements

This SDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.