

## Product Safety Summary

### Ammonium bifluoride

CAS No. : 1341-49-7

This Product Safety Summary is intended to provide a general overview of the chemical substance. The information on the summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found in the Material Safety Data Sheet (MSDS) for the chemical substance.

#### Names

- Ammonium bifluoride (ABF)
- Ammonium difluoride
- Ammonium acid fluoride
- Ammonium hydrogen difluoride
- Ammonium fluoride compound with hydrogen fluoride (1:1)

#### Product Overview

Ammonium bifluoride (ABF) is used for cleaning and etching of metals before they are further processed. It is used as an oil well acidifier and in the etching of glass or cleaning of brick and ceramics. It may also be used for pH adjustment in industrial textile processing or laundries. ABF is available as a solid or liquid solution (in water).

Solvay Fluorides LLC does not sell ammonium bifluoride directly to consumers. Ammonium bifluoride is used in industrial applications and in other processes where workplace exposures can occur.

Ammonium bifluoride is a corrosive chemical and contact can severely irritate and burn the skin and eyes causing possible permanent eye damage. Breathing ammonium bifluoride can severely irritate and burn the nose, throat, and lungs, causing nosebleeds, cough, wheezing and shortness of breath. On contact with water or moist skin, ABF can release hydrofluoric acid, a very dangerous acid.

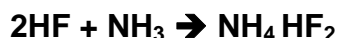


Inhalation or ingestion of large amounts of ammonium bifluoride can cause nausea, vomiting and loss of appetite. Very high or long term exposures can cause fluoride poisoning with stomach pain, weakness, convulsions and death. Long term or repeated exposures can cause deposits of fluorides in bones and teeth, a condition called Fluorosis. This may cause pain, disability and discoloration of teeth.

## Manufacture of Product

The ammonium bifluoride market in North America is estimated to be between 7 and 9 million pounds. Solvay Fluorides, LLC's Mexican affiliate is the only North American producer of solid ABF. Solvay Fluorides makes an ABF solution for sale. Solvay's North American production facilities for this chemical are located in northern Mexico and in the central United States.

- Solvay manufactures solid ammonium bifluoride by mixing ammonia and anhydrous hydrogen fluoride (liquid) together and then drying to form flakes.



- Ammonium bifluoride solution is made by dissolving solid ammonium bifluoride in water.

## Product Description

Ammonium bifluoride ( $\text{NH}_4\cdot\text{HF}_2$ ) is manufactured and sold in solid form or in aqueous solutions. The solid is a white crystal. The solutions are clear, colorless liquids that have a slightly sharp, pungent odor. Common industrial solution strength concentrations are between 28 and 30%. Typical physical properties for ammonium bifluoride are provided in Table 1.

Table 1: Typical physical properties ammonium bifluoride

|                                  | <b>Solid ABF</b>  | <b>29% ABF</b> |
|----------------------------------|-------------------|----------------|
| <b>Melting point</b>             | 125.6° C (256° F) | N/A            |
| <b>Relative Density</b>          | 1.5               | 1.08           |
| <b>pH</b>                        | 2 (5.7 g /l)      | < 1            |
| <b>Flash point</b>               | Non- flammable    |                |
| <b>Decomposition temperature</b> | 230 ° C (446° F)  |                |

## Product Uses

Ammonium bifluoride (ABF) is used for cleaning and etching of metals before the metal is further processed. It is used as an oil well acidifier and in the etching of glass or cleaning of brick and ceramics. It may also be used for pH adjustment in industrial textile processing or laundry applications.

Consumer products containing ammonium bifluoride are primarily products for the etching of glass (hobby) or for ceramic and brick cleaners.

## Exposure Potential

- **Workplace exposure** - Exposure can occur at either an ammonium bifluoride manufacturing facility, a manufacturing or packaging facility that stores, packages or uses ammonium bifluoride, or during transport. The system Solvay uses to manufacture ammonium bifluoride is a closed system with very little potential for exposure to ammonium bifluoride. Other manufacturing processes or systems in which it is used may be open or closed depending on the equipment or application. Persons involved in maintenance, sampling and testing activities, or in the loading and unloading of ammonium bifluoride packages are at greater risk of exposure. Following good industrial hygiene practices will minimize the likelihood of exposure; however, persons involved in higher risk activities should always wear proper personal protective equipment such as rubber gloves and boots, an acid or slicker suit, acid gas respirator, goggles and hard hat. In instances where the potential for splashes is high, a face shield should also be worn.

Exposure limits for ammonium bifluoride made by OSHA, ACGIH and other bodies list limits for the "fluoride" content rather than as ABF specifically. Please consult the [Material Safety Data Sheet](#) for information concerning exposure limits.

- **Consumer exposure to products containing ammonium bifluoride** - Although Solvay Fluorides LLC does not sell ammonium bifluoride directly to consumers, it is used in some consumer cleaning products. The user should use these products in strict adherence with the manufacturer's use and/or label instructions.
- **Environmental releases** - Spills of ammonium bifluoride should be contained and isolated from waterways and sewers or drains. Small spills of solid ammonium bifluoride should be swept or shoveled up and placed in suitable containers for disposal. The contaminated area should be washed down with plenty of water. Spills of liquid



ammonium bifluoride should be diluted with large amounts of water. Lime or calcium hydroxide may be used to neutralize contaminated water and immobilize the fluoride ions as calcium fluoride. Disposal should be in accordance with applicable local, state or federal regulations. Persons attempting to clean up ammonium bifluoride spills should wear proper personal protective equipment (See guidelines in the Workplace exposure section of this document or the [Material Safety Data Sheet](#)). If required, report spills to the appropriate state or federal authorities.

- **Fires** - Fires involving ammonium bifluoride should be extinguished using measures appropriate to the circumstances and surrounding environment. Hazardous decomposition products such as hydrogen fluoride vapor can be generated if ABF is involved in a fire. Fire fighters should wear self-contained breathing apparatus and protective suits.

For additional information concerning ammonium bifluoride emergency response procedures, please consult the [Material Safety Data Sheet](#).

## Health Information

The concentrations of ammonium bifluoride typically found in consumer products may pose risk of symptoms due to skin, ingestion or inhalation exposure. Persons suffering from eye or ingestion exposure to consumer strength ammonium bifluoride products may experience symptoms similar to persons exposed to industrial strength ammonium bifluoride (see below).

Exposures to industrial strength ammonium bifluoride can produce the following adverse health affects:

- **Contact** - Skin exposures can cause symptoms ranging from minor skin irritation to painful redness and swelling. Severe burns can occur if treatment is delayed after exposure to ammonium bifluoride. Eye exposure to ammonium bifluoride may result in severe eye irritation, burns or even blindness.
- **Inhalation** - The inhalation of ammonium bifluoride can cause symptoms ranging from nose and throat irritation to coughing and difficulty breathing. Aspiration may cause pulmonary edema and pneumonitis (fluid on the lungs and inflammation of the lungs). Repeated or prolonged exposures may cause sore throat, nosebleeds and chronic bronchitis. Prolonged exposure may cause hypocalcemia with nervous problems (tetany) and cardiac arrhythmia (reduced calcium levels, spasms and irregular heart beat).
- **Ingestion** - The ingestion of ammonium bifluoride may cause burns of the mouth and throat and perforation of the esophagus and stomach. Nausea, bloody vomiting,



abdominal pain, diarrhea, difficulty breathing, swelling of the throat, loss of consciousness, coma and heart failure can also occur. The ingestion of ammonium bifluoride may be fatal.

- **Other Effects** - The International Agency for Research on Cancer (IARC) has not determined ammonium bifluoride to be carcinogenic (cancer causing).

During most exposures, ammonium bifluoride will dissociate to release hydrofluoric acid. First aid techniques for treatment to hydrofluoric acid exposures are unique. They require a rapid response and the use of calcium (most commonly calcium gluconate solutions or gels) to scavenge and neutralize the fluoride ion. Please consult the [Material Safety Data Sheet](#) for additional information.

For more information on health effects and routes of exposure, or for information concerning proper first aid measures, please consult the [Material Safety Data Sheet](#).

### **Environmental Information**

Ammonium bifluoride is not known to bioaccumulate or persist in the environment more than a few days. However it will decompose in moist environments liberating hydrofluoric acid and ammonia. For more ecological and environmental information concerning this product, please consult the [Material Safety Data Sheet](#).

### **Physical Hazard Information**

Ammonium bifluoride is corrosive and can corrode most metals. It is not flammable or explosive. Ammonium bifluoride will react with water (including perspiration) to form hydrofluoric acid.

Exposure of ammonium bifluoride to strong acids, strong bases, water or high temperatures can cause decomposition. Decomposition of ammonium bifluoride will result in the liberation of hydrogen fluoride, ammonia and nitrogen oxide gases.

For more information concerning the physical hazards of this product, please consult the [Material Safety Data Sheet](#).

## Regulatory Information

Regulations may exist that govern the manufacture, sale, export, import, storage, transportation, use and/or disposal of this chemical. These regulations can vary by city, state, country or geographic region. Information may be found by consulting the relevant [Material Safety Data Sheet](#) specific to your country or region.

## Additional Information

- Solvay North America, LLC ([www.solvaynorthamerica.com](http://www.solvaynorthamerica.com))
- Solvay Chemicals, Inc. ([www.solvaychemicals.us](http://www.solvaychemicals.us))
- Solvay Chemicals Inc. Material Safety Data Sheets ([www.solvaychemicals.us/services/resourcelibrary](http://www.solvaychemicals.us/services/resourcelibrary))
- Contact Solvay Chemicals, Inc. ([www.solvaychemicals.us/feedback](http://www.solvaychemicals.us/feedback))
- NJ Department of Health & Senior Services Hazardous Substance Fact Sheets (<http://web.doh.state.nj.us/rtkhsfs/factsheets.aspx>)
- This summary was prepared October 2009.

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