

## Product Safety Summary

### Ammonium fluoride

CAS No. : 12125-01-8

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 fluoride (AF)
- Neutral ammonium fluoride
- Commercial ammonium fluoride

#### Product Overview

Ammonium fluoride is used primarily for oil well acidification and metal processing. It is also used in the production of electronic components. Ammonium fluoride is sold as a solid or a liquid (water) solution.

Solvay Chemicals, Inc. does not sell ammonium fluoride directly to consumers. However, AF has been used in some consumer cleaning products. Most ammonium fluoride is used in industrial applications and processes.

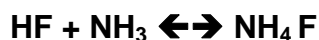
Ammonium fluoride is a corrosive chemical and contact can severely irritate and burn the skin and eyes causing possible permanent eye damage. Breathing ammonium fluoride can severely irritate and burn the nose, throat, and lungs, causing nosebleeds, cough, wheezing and shortness of breath. Contact of ammonium fluoride with water or moist skin can release hydrofluoric acid, a very dangerous acid. Ammonium fluoride crystals are hygroscopic (absorb moisture from the air). They also sublime (vaporize without going into a liquid state).

Inhalation or ingestion of large amounts of ammonium fluoride can cause nausea, vomiting and loss of appetite. Exposure to high concentrations or long term exposure to

lower concentrations can cause fluoride poisoning with stomach pain, weakness, convulsions, collapse and death. It can also cause deposits of fluorides in bones and teeth, a condition called Fluorosis. Symptoms of fluorosis may include pain, disability and discoloration of teeth.

### Manufacture of Product

- The ammonium fluoride market in North America is currently 6 to 8 million pounds per year. Solvay Chemicals, Inc., through its subsidiary Solvay Fluorides, LLC., is the only North American producer of solid ammonium fluoride. Solvay also provides solutions of ammonium fluoride for industrial sale. Solvay's North American production facilities are located in northern Mexico and in the central United States.
- Solvay manufactures solid ammonium fluoride by mixing ammonia and anhydrous hydrogen fluoride (liquid) together and then drying to form flakes.



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

### Product Description

Ammonium fluoride (NH<sub>4</sub>F) is manufactured and sold in solid form or in aqueous solutions. The solid is a white, hygroscopic, crystal. The solutions are clear, colorless liquids that have a slightly sharp, pungent odor. Common industrial solution strength concentrations are 36-40% in water. Typical physical properties for ammonium fluoride are provided in Table 1.

Table 1: Typical physical properties ammonium fluoride

	<b>Solid</b>	<b>36-40% AF (aqueous solution)</b>
<b>Melting point /Decomposition temperature</b>	<212°F (<100°C)	N/A
<b>Relative Density</b>	1.32	1.1
<b>pH @ 20°C (68°F)</b>	7-10	7.2



	(667 g /l)	
<b>Flash point</b>	Non- flammable	

**Product Uses**

Ammonium fluoride is used primarily for oil well acidification and metal processing. It is also used in the production of electronic components.

Some cleaning products such as wheel, brick and concrete cleaners may contain ammonium fluoride.

**Exposure Potential**

- **Workplace exposure** - Exposure can occur at either an ammonium fluoride manufacturing facility, or a manufacturing, packaging or storage facility that handles ammonium fluoride. Exposure may also occur in the event of a transportation incident. The system Solvay uses to manufacture ammonium fluoride is a closed system with minimal exposure to ammonium fluoride. 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 fluoride 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, respiratory protection, goggles and a hard hat. In instances where the potential for splashes is high, a face shield should also be worn.

Please consult the [Material Safety Data Sheet](#) for occupational exposure limits.

- **Consumer exposure to products containing ammonium fluoride** - Solvay Chemicals, Inc. does not sell ammonium fluoride directly to consumers. Users should follow the manufacturer’s use and/or label instructions if ammonium fluoride is listed as a component.
- **Environmental releases** - Spills of ammonium fluoride should be contained and isolated from waterways, sewers and drains. Small spills of solid ammonium fluoride 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 fluoride should be diluted with large amounts of water. Lime or calcium



hydroxide may be used to neutralize the contaminated water and immobilize the fluoride ions as calcium fluoride. Disposal should be in accordance with applicable local, state and federal regulations. Persons attempting to clean up ammonium fluoride 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 fluoride should be extinguished using measures appropriate to the circumstances and surrounding environment. Hazardous decomposition products such as hydrogen fluoride will be generated. Fire fighters should wear self-contained breathing apparatus and protective suits.

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

## Health Information

The concentrations of ammonium fluoride potentially 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 fluoride products may experience symptoms similar to persons exposed to industrial strength ammonium fluoride (see below).

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

- **Contact** - Skin exposures can cause symptoms ranging from minor skin irritation to painful redness. Severe burns can occur if treatment is delayed after exposure to ammonium fluoride. Eye exposure to ammonium fluoride may result in severe eye irritation, burns or even blindness.
- **Inhalation** - The inhalation of ammonium fluoride 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). Prolonged exposures may cause sore throat, nosebleeds and chronic bronchitis. High concentration exposures may cause hypocalcemia with nervous system disorders (tetany) and cardiac arrhythmia (reduced calcium levels, spasms and irregular heart beat). Chronic inhalation of ammonium fluoride can cause skeletal fluorosis (adverse changes in bone structure.)
- **Ingestion** - The ingestion of ammonium fluoride 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 solutions of ammonium fluoride may be fatal. Chronic ingestion of ammonium fluoride can cause dental fluorosis (discoloring of teeth) and skeletal fluorosis (adverse changes in bone structure).

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

During exposure, ammonium fluoride may 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 fluoride 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 fluoride is corrosive and can corrode certain metals. It is not flammable or explosive. Ammonium fluoride will react with water (including perspiration) and may form hydrofluoric acid.

Exposure of ammonium fluoride to strong acids, strong bases, metals, water or high temperatures can cause decomposition. Decomposition of ammonium fluoride 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 May 2010.

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