

# Hydrobromic Acid

---

Hydrobromic acid is a versatile chemical that is used by a number of different industries. Among its many uses, hydrobromic acid is utilized as a flux material in soldering materials, as an activator to make certain plastics, and as a chemical intermediate. It is also a raw material for the manufacture of oil field salts, useful in food safety applications, and a reactant in the manufacture of pharmaceuticals. Hydrobromic acid is a liquid made by dissolving hydrogen bromide gas in water. Because the hydrogen bromide used to make hydrobromic acid is a pressurized gas, it has different hazards than this product and has its own Product Safety Assessment. (For more information see the Product Safety Assessment for Anhydrous Hydrogen Bromide). Hydrobromic acid offered by LANXESS Solutions US Inc. can be produced in various concentrations, but the most common contains 48% hydrogen bromide in water. It is a clear, near water-white to yellow colored liquid with a characteristic acrid odor.

## Identification

Hydrobromic acid is identified by several names, all of them referring to the same chemical product. These names include:

- HBr (commonly 48% HBr)
- CAS Number [10035-10-6]
- Aqueous hydrogen bromide, aqHBr
- Hydrogen bromide aqueous solution
- Example: Hydrogen bromide, 48%;
- Hydrobromic acid

### Description

#### Production:

The gaseous hydrogen bromide used to make hydrobromic acid is derived from either the burning of bromine and hydrogen in a specially designed furnace or as an off-gas from a bromination reaction where it is a co-product. Regardless of the source, the gaseous hydrogen bromide is then dissolved into water to form 48% hydrobromic acid in manufacturing units designed for this purpose. Lower concentrations of hydrobromic acid are made by dilution of 48% hydrobromic acid with additional water to the desired concentration. The hydrobromic acid is then packaged for shipment. Hydrobromic acid is packaged in pails, drums, intermediate bulk containers and bulk containers for transport to customers.

#### Uses:

Hydrobromic acid is used as

- an intermediate to manufacture agricultural, chemical and pharmaceutical intermediates.
- a polymerization initiator to produce certain plastics
- a flux material for particular types of solder where it acts to clean the metal to allow for a strong solder bond.
- an agent to control bacteria in food safety applications.
- a raw material to manufacture oil field salts used as completion fluids for oil wells.

<b>Properties:</b>	Boiling Point:	126 °C
	Freezing Point (48%):	-63 °C
	Solubility in Water:	Miscible

### Potential Human Health Effects

#### Health Effects:

Hydrobromic acid is a corrosive material, and contact with the liquid or its vapors can irritate or damage the respiratory system, eyes, skin and mucous membranes. Extended contact with hydrobromic acid can lead to chemical burns especially to the skin or eyes; thus appropriate personal protective equipment should be used when working with hydrobromic acid. An odor threshold of 2 ppm has been established for hydrobromic acid, which means that the characteristic odor of its vapors should be able to be detected at levels that are at or below established concentrations which cause serious harm. If contact with the liquid or vapors occur, the affected area should be flooded with water for an extended period of time to minimize the impact of exposure.

## Product Safety Assessment: Hydrobromic Acid

---

Consumer contact with hydrobromic acid is very unlikely given its highly controlled distribution for manufacturing uses.

### **Industrial Use:**

Hydrobromic acid is used to manufacture widely diverse products and is sold only for production in highly controlled manufacturing facilities by people trained in the hazards of chemicals. Hydrobromic acid used in a manufacturing setting will be handled using best practice techniques developed to minimize any potential risk of exposure to liquids and vapors. Industry utilizes engineered systems to minimize the potential for exposure to hazardous chemicals. Employees using hydrobromic acid are highly trained and required to wear specialized protective clothing for additional protection when working with hydrobromic acid. Unplanned releases or spills of hydrobromic acid can present an immediate danger to life and health. In any spill or release incident, all non-essential personnel are immediately evacuated upwind of the spilled material. All personnel involved with correcting the situation are trained and properly equipped with the required personal protective equipment.

### **Laboratory Use:**

Because it is a building block chemical and its chemistry characteristics are well-understood, hydrobromic acid is regularly used in research laboratories in small quantities to develop new molecules. Similar to industry, scientists use chemical training, engineered systems and specialized protective clothing when working with hydrobromic acid to minimize the potential for adverse effects.

### **Consumer Use:**

It is very unlikely that consumers would be exposed to hydrogen bromide, because it is not sold directly to them. Because it is an acid with useful properties, it is possible it could be found in the home environment in appropriately labeled consumer products like soldering flux or cleaning products. However, LANXESS Solutions US Inc. does not provide hydrobromic acid for consumer products.

### **Environmental Release:**

Hydrobromic acid is handled using highly-engineered systems designed to minimize any release to the environment. When a container of hydrobromic acid is opened for transfer to another vessel, there is the potential for a small amount of the material to be released to the environment.

### Physical Hazards

Hydrobromic acid is made by dissolving hydrogen bromide gas into water. The more concentrated 48% version of hydrobromic acid will be more likely to release hydrogen bromide vapors than lower concentration products. Heating hydrobromic acid in an open container will cause the release of more vapors. The material may darken from a near water white solution to an amber colored solution with exposure to air, metals and/or sunlight. Hydrogen bromide is a corrosive liquid that will react with many metals and can damage human tissues if liquid or vapor contact occurs.

### Potential Environmental Impact

#### Environmental Fate Information:

The most significant environmental release that could occur would be due to rupture of a hydrobromic acid container. Whether the release is to soil or water the acid should be contained until it can be transferred to another container or reacted in a controlled manner with appropriate chemical bases, such as slaked lime or sodium carbonate under professional supervision to neutralize its corrosive effects. In contact with soil, hydrobromic acid will form simple bromide salts with minerals that are likely to be present. If hydrobromic acid is spilled onto soil or other porous materials, it should be exhumed, neutralized, and properly disposed of. The small amounts of hydrogen bromide vapors that could be released from hydrobromic acid during handling are expected to react with components in the atmosphere and be derivitized before long range transport can occur. Because of its activity in soil, hydrobromic acid is not considered to be bioaccumulative.

#### Aquatic and/or Terrestrial Toxicity:

Hydrobromic acid may have toxic effects on living organisms. The primary effect on aquatic organisms (e.g., fish, invertebrates, microorganisms, etc.) is an impaired ability to balance ions. The pH reduction may also cause aluminum and other metals to change form and be mobilized at toxic levels. The particular toxic effects that are observed are determined by the amount of hydrobromic acid released and the sensitivity of the organisms to the substance and the acidity level.

### Product Stewardship

#### Manufacturing locations:

Facility management procedures, Safety Data Sheets, technical guidance documents, and training are available to communicate safe handling, risk mitigation measures and emergency response information and requirements to employees.

#### Environment:

When hydrobromic acid is used as a chemical intermediate, it is destroyed during use. Systems that use hydrobromic acid control the potential for emissions using carbon adsorption systems, chemical scrubbers, recycle systems or other capture systems. If hydrobromic acid is released to the environment, the area should be evacuated, and hazardous materials professionals must be called to monitor and manage the situation.

#### Consumers:

Consumers are not usually exposed to hydrobromic acid because LANXESS Solutions US Inc. does not directly sell to them. However, because it is an acid with useful properties, it is possible it could be found in the home environment in consumer products like soldering flux or cleaning products. Consumers should follow the manufacturer's label and safety recommendations for all products they purchase that contain chemicals to minimize handling hazards.

Hydrobromic acid is among the many hazardous materials that are commonly shipped to manufacturing locations. Consequently, there exists the potential for the general public to be exposed to hydrobromic acid during a transport accident. Because of the properties and hazards of hydrobromic acid, special sturdy containers are used to transport it worldwide. Additional precautions are taken throughout transport to ensure the vessel movements are well controlled and the risk to the public is minimized.

LANXESS Solutions US Inc. conducts an ongoing analysis of its products to evaluate potential risk areas throughout the product's life cycle. Chemical risks are identified at the very early stage of new products. They are evaluated by stage-gated reviews using environmental, health, and safety (EHS) criteria. The analysis of existing products will evaluate raw materials, manufacturing, transportation, customer end-use and disposal. Additionally, before changes in existing product formulations are made, a detailed evaluation is made of the proposed change. A critical component of all of these processes is the Safety Data Sheet, which lists detailed product hazard information.

## **Product Safety Assessment: Hydrobromic Acid**

---

In the context of a continually improving risk-reduction program, LANXESS Solutions US Inc. conducts periodic reviews of current controls occur in order to identify opportunities for improvements or enhancements to the handling of our products. This includes adaption of existing procedures to changes in regulations (e.g., covering workplace and transportation).

### **Conclusion**

Hydrobromic acid is a unique substance with a wide variety of uses in manufacturing. Though it is a hazardous material, it is only handled by highly trained people in manufacturing environments utilizing specialty equipment, safety controls and personal protective equipment. There are relatively few locations around the world where it is made.

### **Contact Information**

LANXESS Solutions US Inc.

[www.LANXESS.com](http://www.LANXESS.com)

### **Notices**

#### **Use and Application Information**

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.