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Product Stewardship Summary

CAS: 10035-10-6
Formula: HBr

Hydrobromic Acid, Aqueous Solution

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Introduction

Hydrobromic acid (HBr) aqueous solution is a powerful mineral acid that is an essential chemical tool in modern manufacturing. Hundreds of other compounds made with HBr are combined in a variety of ways to make such things as semiconductors, fuels, plastics and medicines.

HBr is used to make biocides that control microorganisms and save energy in cooling towers and decorative fountains. Many completion fluids that help protect the environment and improve production in oil and gas wells are produced using HBr.

HBr does all these things and more by combining with other products and by controlling chemical reactions, so we can't see it at work. But without it, many of us wouldn't be as healthy or as

comfortable, and our homes and businesses would likely be less energy efficient.

Description and Properties

Hydrobromic acid is a colorless to yellow liquid that is considerably denser than water and has a sharp, irritating odor. It is nonflammable, but is highly corrosive to most metals.

Uses

HBr is a powerful acid that is among the most effective cleaning agents available for removing tough mineral scale from the interiors of boilers used in industrial plants and commercial heating systems. It is used in engraving and a type of printing called lithography, and is a key ingredient in the manufacture of certain soldering fluxes, photographic chemicals and textile finishing.



Oil refiners use hydrobromic acid to make ingredients for high-octane gasoline and aviation fuel, along with intermediate compounds that are used to make plastics, cosmetics and synthetic fibers.

HBr is an important chemical tool that is used to make very dense liquids called completion fluids for oil and gas exploration.

Drillers rely on these clear, heavy fluids to support the well bore and prevent contamination of underground formations while preparing wells to produce oil and gas.

Some popular biocides are made in processes that rely on hydrobromic acid as an intermediate, and these products protect our health and save energy by controlling algae and bacteria in fountains, cooling towers and industrial water treatment applications.

In highly diluted form, HBr's medicinal properties have been valued for more than a century, and at one time it was used for pain relief and as an anti-convulsant. Today it is used as an intermediate in the production of various pharmaceuticals, including pain relievers and antidepressants.

Health Information

Hydrobromic acid can cause severe burns to the eyes, skin, and mucous membranes in the mouth, throat and

nose. Exposure to high concentrations can cause death from swelling or spasm of the throat, or respiratory inflammation. Long-term exposure may cause chronic nasal and bronchial discharge and chronic indigestion. Inhalation of vapors may cause coughing, nose bleeds, dizziness, headache, delayed abdominal pain and diarrhea.

Exposure Potential

You are very unlikely to be exposed to hydrobromic acid even if you work in a manufacturing process that uses it or you're involved in transporting HBr.

Exposure is unlikely because HBr is stored and transported in durable protective containers designed to prevent contact with the material, and because ventilation and personal protective equipment are required when handling HBr.

In the event of a spill or accidental release, hydrobromic acid will produce vapors that will spread downwind along the ground and may collect in low spots. Avoid contact with the liquid and get away from the vapors by moving upwind. If you must work where the potential exists for exposure, your employer will

require that you wear a full-coverage protective suit and supplied-air respirator or self-contained breathing equipment designed for use with acids.

Environmental Information

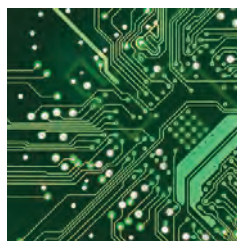
Small quantities of hydrobromic acid are sometimes released naturally during volcanic eruptions. It is harmful to vegetation, and high concentrations may be toxic to fish. Whether or not produced by natural processes, hydrobromic acid's reactivity means that it is unlikely to persist in the environment for extended periods.

Physical Hazards

Hydrobromic acid is stored and transported in sealed containers made with compatible materials and designed to prevent unintentional releases. If the containers are subjected to fire they may burst, releasing toxic hydrogen bromide and bromine gas.

If containers are punctured, hydrobromic acid may come into contact with common metals, producing hydrogen gas. Leaking HBr is highly corrosive, and it may react

with a variety of other compounds to produce heat, and toxic, corrosive smoke and fumes.



Derivation/Manufacturing

Hydrobromic acid is made in Europe, Asia and the Americas. Albemarle Corporation makes hydrobromic acid in its Magnolia, Arkansas, manufacturing complex and at its Jordan Bromine Company joint-venture facility in Safi, Jordan.

Regulatory Information

Although the US Environmental Protection Agency (EPA) does not specifically list hydrobromic acid as a hazardous waste, the agency does require employers to treat it as hazardous because it is corrosive. It is regulated under CERCLA/RCRA regulations as a hazardous waste or material for the same reason. If spilled, it can be neutralized so that it is no longer corrosive, and may then be disposed of as a non-hazardous waste in compliance with local, state and federal regulations.

Hydrobromic acid is classified by the US Department of Transportation as a corrosive compound (DOT HAZARD CLASS: 8 (corrosive), DOT ID NUMBER: UN1788). It is a class 1 “immediate-acute” health hazard under SARA 311/312 regulations.

The OSHA-permissible exposure limit (PEL) for hydrobromic acid is 3 ppm (10 mg/m³) as an 8-hour time-weighted average concentration. Based on the potential for eye, mucous membrane, and skin irritation, the National Institute for Occupational Safety and Health (NIOSH) exposure limit for hydrobromic acid also is 3 ppm as a ceiling limit. The American

Conference of Governmental Industrial Hygienists (ACGIH) has a ceiling limit of 2 ppm.

HBr has been pre-registered under the European Community Regulation “REACH.”

Product Stewardship

Albemarle Corporation is committed to manage hydrobromic acid so that it can be safely distributed and used. We work with our customers to minimize the risks of leakage and personnel exposure by complying with applicable regulations, including those that specify the use of appropriate containers and protective equipment. We also reserve the right to review inspection reports and maintenance records for customer containers.

Transportation firms are required to meet strict safety standards before transporting the product, and strict Albemarle engineering standards apply to all company-owned containers.

In the unlikely event of a transportation incident, Albemarle is staffed and organized to document and investigate, and to facilitate corrective action. In addition, we can provide guidance to our customers in proper handling and storage techniques and systems, along with

emergency response procedures, and we encourage communication about safety procedures.

Although Albemarle does not take responsibility for customer safety programs, we may make safety recommendations to our customers.

Conclusion

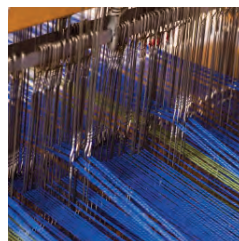
Hydrobromic acid is a powerful chemical compound that is both a useful tool for manufacturing chemists and a valuable raw material. As with all powerful tools, it must be handled with care by trained, well-equipped professionals. Handled properly, it rewards us with everything

from high-energy fuels to health-giving drugs – and does so safely and without harm to our environment.

Note

This document provides general information about hydrobromic acid

and does not supplant or replace required regulatory and/or legal communication documents, nor is it intended to provide an in-depth discussion of health and safety information. Always consult the product’s material safety data sheet, product label and technical data sheet before using the chemical.



References

Hydrobromic Acid, Anhydrous Material Safety Data Sheet

Albemarle Corporation, July 11, 2006

Hydrobromic Acid, Anhydrous Liquid Product Data Sheet

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Hydrobromic Acid 48% Product Data Sheet

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Hydrogen bromide is a component of volcano gas.

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