LANXESS
Energizing Chemistry

Alkyl Bromides

The alkyl bromides covered by this product safety assessment include the LANXESS Solutions US Inc. products ethyl bromide, n-butyl bromide, dibromomethane, dibromoethane, cetyl bromide, stearyl bromide and lauryl bromide (collectively referred to as "alkyl bromides" in this product safety assessment). Separate product safety assessments have been written for other alkyl bromide products, namely n-propyl bromide and methyl bromide. Alkyl bromides are primarily used as "building block" chemicals that are reacted with other chemicals in highly-controlled industrial settings to make other chemical products. Alkyl bromides are typically made by reacting an alcohol with either anhydrous or aqueous hydrogen bromide. Liquid alkyl bromides have a distinctive ethereal smell. Alkyl bromides can be safely used in industrial settings where engineering controls and personal protective equipment are used in concert with administrative controls to minimize exposure and prevent releases of the chemical. Since the alkyl bromides covered by this product safety assessment are industrial chemicals used only in industrial settings, the general public is unlikely to come into contact with these products.

Identification

Alkyl Bromide Name	CAS Number	Synonyms			
Ethyl Bromide	74-96-4	Bromoethane	Bromic Ether	Hydrobromic Ether	EB
n-Butyl Bromide	109-65-9	1-bromobutane	1-butyl bromide	butyl bromide	nBB
Dibromomethane	74-95-3	Methylene Dibromide	Methylene bromide	DBM	
Dibromoethane	106-93-4	Ethylene Dibromide	Glycol dibromide	1,2-dibromoethane	DBE, EDB
Cetyl Bromide	112-82-3	1-bromohexadecane	Hexadecyl bromide	n-Hexadecyl bromide	Palmityl bromide
Stearyl Bromide	112-89-0	1-bromooctadecane	Octadecyl bromide		
Lauryl Bromide	143-15-7	1-bromododecane	Dodecyl bromide		

Description

Production:

Alkyl bromides are made in manufacturing units designed for the production of chemicals by reacting a hydrocarbon with a bromine-based chemical (typically either hydrogen bromide or elemental bromine) before being isolated and packaged. All forms of alkyl bromide are packaged in either drums or bulk containers for distribution to the industrial sites where they will be utilized.

Uses:

Alkyl bromides are used by chemical companies that make agricultural, pharmaceutical and industrial products as chemical intermediates (or "building block" chemicals) to make other value-added chemical products.

Properties:

The alkyl bromides range in boiling point from 38 °C to well over 300 °C depending upon the chain length and structure. Similarly, the melting points range from -119 °C to 23 °C. They possess limited solubility in water. Please consult with each respective alkyl bromide's Safety Data Sheet for additional specific physical and chemical properties.

Potential Human Health Effects

Health Effects:

Alkyl bromides are safe to use in industrial settings when proper handling protocols are followed and recommended exposure guidelines are not exceeded.

In liquid form, alkyl bromides are very good solvents, so much so that skin contact with the liquid will result in the removal of oils and fats from the skin and could lead to irritation and cracking. Impervious gloves should be worn to prevent skin contact in the industrial settings where alkyl bromides are routinely handled. Alkyl bromides that are trapped against the skin could induce rashes or cause chemical burns.

Alkyl bromide liquids and vapors can irritate the respiratory system and eyes. Direct splashes into the eyes could cause chemical burns, and eye protection should be worn when handling alkyl bromides.

Because liquid alkyl bromides readily form vapors at ambient and elevated temperatures, inhalation is the most significant exposure risk. Though low exposure concentrations to alkyl bromides vapor can be tolerated, higher concentrations may lead to discomfort and result in coughing, wheezing, and severe irritation of the nose, throat and respiratory tract. Liquid alkyl bromides all exhibit a characteristic ethereal odor that provides a good warning indicator of the presence of the chemical. Ethylene dibromide, ethyl bromide and dibromomethane toxicological test results indicate that that they could cause cancer or be mutagens. Individuals exposed to excessively high vapor concentrations of some of the alkyl bromides over extended time frames could experience damage to their nervous and reproductive systems. For all these reasons, it is important that safety recommendations for the handling of alkyl bromides are followed at all times, including use of appropriate personal protective equipment. Consult the respective Safety Data Sheet for health effect information and appropriate protective measures specific for each alkyl bromide.

Industrial Use:

Alkyl bromides are used to manufacture widely diverse products and are sold only for use in highly controlled manufacturing facilities by people trained in the hazards of chemicals. Alkyl bromides used in a manufacturing setting should be handled using best practice techniques developed to minimize any potential risk of exposure to liquids and vapors. When alkyl bromides are handled as chemical intermediates, manufacturing sites utilize highly engineered systems to minimize the potential for exposure to all process chemicals. Unplanned releases or spills of alkyl bromides, though serious, are not likely to represent a life-threatening situation unless they occur in a tightly enclosed space with inadequate ventilation. In any spill or release incident, all non-essential personnel are immediately evacuated upwind of the spilled material. All personnel involved with correcting a spill situation are trained and properly equipped with the required personal protective equipment.

Laboratory Use:

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

Consumer Use:

LANXESS Solutions US Inc. alkyl bromides products are sold only to industrial users. There are no known consumer uses for these substances, so it is very unlikely that consumers would be exposed to these LANXESS Solutions US Inc. products.

Environmental Release:

Alkyl bromides are handled using highly-engineered systems designed to minimize any release into the environment. When alkyl bromides are transferred from one vessel to another, there exists a potential for a small amount of the material to be released into the environment. However, because alkyl bromides are generally handled in liquid form and have a distinctive odor, leaks during transfer are readily observed or noted and can be quickly corrected.

Alkyl bromides that are released into the environment will either readily evaporate if on a hard surface and/or will soak into soil or other porous materials. Contained alkyl bromides can be collected in plastic or metal drums. Soils wetted with alkyl bromides should be collected and properly disposed of.

Physical Hazards

The alkyl bromides that are addressed through this product safety assessment are near water-white and clear when in liquid form. Stearyl bromide, cetyl bromide, dibromoethane and lauryl bromide will readily solidify when they are cold enough. Liquid alkyl bromides have strong ethereal solvent odors. Ethyl bromide, dibromomethane and ethylene dibromide do not readily catch fire or burn. n-butyl bromide is classified as a flammable liquid, and lauryl bromide, cetyl bromide and stearyl bromide are classified as combustible materials. Alkyl bromides are known to react slowly with water to form corrosive acids and can also react with certain metals like aluminum or zinc. Under special controlled reaction conditions and with other chemicals, alkyl bromides are useful as building block chemicals to manufacture other value-added chemical products. Please consult with each respective alkyl bromide's Safety Data Sheet for additional specific physical and chemical properties.

Potential Environmental Impact

Environmental Fate Information:

Alkyl bromides are only slightly soluble in water and will form a distinct lower layer when added to water. When in the presence of moisture, alkyl bromides will slowly react with water to form corrosive acids. When spilled on a hard, impervious surface liquid alkyl bromides will either readily evaporate or, in the case of cetyl, stearyl and lauryl bromide, solidify on a cool surface.

Aquatic and/or Terrestrial Toxicity:

Releases of alkyl bromides into the aquatic or terrestrial environment should be avoided.
Dibromoethane (aka ethylene dibromide) is known to kill pests in the soil. LANXESS Solutions US Inc. does not sell dibromoethane for use in pesticidal applications. Alkyl bromides are generally readily biodegradable and not expected to bioaccumulate. Soils containing alkyl bromides should be remediated to remove signs of the chemical.

Product Stewardship

Manufacturing locations:

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

Environment:

When alkyl bromides are used as chemical intermediates, they are destroyed during use. Systems that use alkyl bromides control potential air emissions using specially designed air pollution control devices and operating procedures. Wastewater and other waste are managed in accordance with federal, state and local requirements. If alkyl bromides are accidentally released to the environment, the area should be evacuated, and hazardous materials professionals must be called to manage the situation and monitor the area to evaluate the vapors in the area and remediate the spill.

Consumers:

Consumers are not exposed to alkyl bromides distributed by LANXESS Solutions US Inc. because we do not sell directly to consumers nor do we endorse sales to consumer markets.

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.

Potential product risks are reviewed according to current controls. In the context of a continually improving risk-reduction program, periodic reviews of current controls occur in order to identify opportunities for improvements or enhancements. This includes adaption of existing procedures to changes in regulations (e.g., covering workplace and transportation).

Conclusion

Alkyl bromides are unique substances with a wide variety of uses in manufacturing. Though there are potential hazards associated with alkyl bromides, they are only handled by highly trained people in manufacturing environments utilizing engineered systems, specialty equipment, safety controls, and personal protective equipment.

Contact Information

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Notices

Use and Application Information