LANXESS
Energizing Chemistry

Methyl Bromide

Methyl bromide (MeBr) is an odorless, colorless gas that is used primarily as a soil fumigant and commodity fumigant to control pests across a wide range of agricultural sectors. Methyl bromide also has use as an industrial chemical. Because methyl bromide is classified as a chemical that depletes the stratospheric ozone layer, a number of countries limit the amount of methyl bromide that is produced, exported or imported, pursuant to obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer (the "Protocol") and regional regulations. In the U.S., for example, under the Protocol and the Clean Air Act, the production and import of methyl bromide is only allowed under an exemption. Other countries' use-allowances vary, but the U.S. exemptions to the phase-out include: 1) the Quarantine and Pre-shipment (QPS) exemption to eliminate quarantine pests, 2) the Critical Use Exemption (CUE) allowed for agricultural users without technically or economically feasible alternatives, and 3) use as a reactant in industrial processes.

Strict regulations are in place for the production and distribution of methyl bromide in the U.S. and most other countries. Methyl bromide fumigant products are "restricted use pesticides," meaning only professionally licensed applicators can buy and use them. The production and purchase of methyl bromide as an industrial intermediate also requires proper documentation of the intended use before the product can be distributed.

Identification

- Methyl bromide;
- bromomethane;
- CH3Br;
- CAS no. 74-83-9;
- alkyl bromide.

Great Lakes Solutions branded products containing methyl bromide include:

- Meth-O-Gas®
- Brom-O-Gas®

- Terr-O-Gas®

Description

Production:

Methyl bromide is made using dedicated production units in Great Lakes Solutions' Arkansas plant. Bulk volumes of methyl bromide are repackaged into smaller containers for shipment.

Uses:

Pesticide/Fumigant: Used as the active ingredient in EPA-registered pesticides, which are used for pre-plant soil fumigation or post-harvest commodity fumigation.

Industrial Chemical Intermediate/Feedstock: Used as a chemical intermediate, typically as a methylating agent in industrial manufacturing applications.

Properties:

Boiling Point:	-66.8 °C
Melting Point:	-86 °C
Water Solubility:	Freely soluble in water

Potential Human Health Effects

Health Effects:

Because methyl bromide is a gas at ambient temperatures, inhalation is the most significant route of exposure. The effects noted following inhalation of methyl bromide vary according to the degree and duration of the exposure, but in general, exposure to excessive amounts can disturb normal psychic, motor and gastrointestinal functions and lead to serious injury or death.

Liquid methyl bromide that splashes into the eye can cause severe burns and blindness. Liquid methyl bromide that splashes onto the skin for a short time can cause severe itching of the skin. Methyl bromide that is trapped against the skin will result in chemical burns.

Pesticide Application/Use:

As a highly-regulated pesticide, methyl bromide is a strictly controlled product. It can only be used by licensed or authorized personnel and applicators. Protective measures for the applicator during use of the product are mandated by the regulatory authorities.

Industrial Use:

Methyl bromide is commonly used as a methylating agent in industrial processes, (e.g., in the production of pharmaceuticals or crop protection chemicals).

Laboratory Use:

Because it is a building block chemical and the chemistry characteristics are well-understood, methyl bromide is 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 methyl bromide.

Consumer Use:

Consumers are not expected to be exposed to methyl bromide because it is not sold directly to them.

Environmental Release:

Methyl bromide is destroyed in a chemical reaction when used as a chemical intermediate. Consequently, the release of methyl bromide into the environment during an industrial use is not expected. Pesticide application releases of methyl bromide should only take place when controlled, authorized and permitted by federal and local regulatory authorities. Unauthorized of methyl bromide intended for use as a pesticide is against the law. Regulations vary by region but typically mandate that methyl bromide quantities accidentally released into the environment in excess of specified threshold levels must be reported to the appropriate government agencies.

Physical Hazards

Methyl bromide is a colorless, odorless gas at room temperature and normal atmospheric pressure (boiling point: 38.5° F). The physical state of methyl bromide in Great Lakes Solutions' standard packages is a liquefied gas under pressure. As methyl bromide evaporates, the pure gas is about three times heavier than air. Methyl bromide is hazardous in both the liquid and gas forms. Liquid methyl bromide is incompatible with a number of metals and alloys. Methyl bromide is considered to be non-flammable, except in a very narrow range of 10%-15% by volume in air.

Potential Environmental Impact

Environmental Fate Information:

Because it readily evaporates, methyl bromide does not accumulate in soil or water. Similarly, the volatility of methyl bromide limits the likelihood of exposure to fish and wildlife. However, because it is a pesticide intended to kill a variety of pests, studies have shown that methyl bromide is toxic to humans, animals, aquatic life and even molds and seeds. Professionals using methyl bromide must use caution to avoid discharges into lakes, streams, ponds, estuaries, oceans and other waterways.

Product Stewardship

Pesticide Use:

The production and sale of methyl bromide pesticide requires strict regulatory controls and documentation. For example, in the U.S., training is required prior to purchase of Meth-O-Gas® commodity fumigant products, and a fumigation applicator or user is required to obtain a state fumigation license. In addition to implementing training programs, technical service and emergency response are available for methyl bromide products 24 hours a day, seven days a week. In addition, the Great Lakes Fumigant web site provides access to labels, SDS and product literature and information to provide guidance on how to handle and use fumigant products safely. LANXESS Solutions US Inc. manufacturing and quality assurance programs provide the highest quality methyl bromide in fully DOT-compliant shipping containers. Internal, customer, re-packager (companies that transfer methyl bromide to smaller packages) and supplier audits are conducted to monitor and ensure regulatory compliance for production and distribution of methyl bromide products. Vendors and re-packagers must meet qualification standards as part of the business contract.

Industrial Use:

Use of methyl bromide as a chemical intermediate is subject to documentation requirements to confirm and substantiate the purpose and quantity of use. LANXESS Solutions US Inc. provides training for entities wishing to use methyl bromide, and technical service and emergency response are available 24 hours a day, seven days a week. LANXESS Solutions US Inc. manufacturing and quality assurance programs provide the highest quality methyl bromide in the safest container available. Internal and customer audits are conducted to monitor and ensure regulatory compliance for production and use of methyl bromide products.

Fumigant products:

Manufacturing Locations:

Facility process safety management procedures, SDS, and training programs are in place to communicate safe handling, risk mitigation measures, and emergency response information and requirements for employees at facilities where methyl bromide is made and handled.

Applicator/Users:

Risk mitigation measures for the applicator during use of the product as a pesticide are mandated by the regulatory agency having jurisdiction (for example, in the U.S., the Environmental Protection Agency (EPA)) and are communicated to the user on the product label. Additional information is also found on the product SDS.

Environment:

Protective measures for the environment during use of the product are mandated by the regulatory agency having jurisdiction and are communicated to the user on the product label. Additional information is also found on the product SDS.

Industrial product:

Manufacturing Locations:

Facility process safety management procedures, SDS, and training programs are in place to communicate safe handling, protective measures, and emergency response information and additional requirements to employees.

Environment:

When utilized as a chemical intermediate, methyl bromide is handled in tightly closed engineered systems. As a chemical intermediate, it is destroyed during use and no longer available for release to the environment. Unreacted methyl bromide from engineered processes is controlled through the use of carbon adsorption systems, chemical scrubbers or incineration.

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 product development. 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 that are identified 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 adaptation of existing procedures to changes in regulations (e.g., covering workplace and transportation).

Conclusion

Methyl bromide is a very toxic chemical and its manufacture, distribution, and uses are strictly regulated. It can only be used by licensed or authorized trained personnel in fumigation applications or in highly-engineered systems when used as an intermediate. Protective measures for the users are mandated by the label and the SDS, and these requirements are emphasized in training programs. The general public cannot purchase or use methyl bromide products and is unlikely to ever encounter it in everyday activities.

References

Additional information about methyl bromide can be found at these websites:

- http://www.inchem.org/documents/ehc/ehc/ehc166.htm
- http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=822&tid=160
- http://www.atsdr.cdc.gov/mmg/mmg.asp?id=818&tid=160
- http://www.epa.gov/ozone/mbr/index.html

- http://www.fao.org/docrep/X5042E/X5042E00.htm
- http://pmep.cce.cornell.edu/profiles/extoxnet/haloxyfop-methylparathion/methyl-bromide-ext.html
- http://www.pesticideinfo.org/Detail_Chemical.jsp?Rec_Id=PC32864
- http://oehha.ca.gov/air/chronic_rels/pdf/74839.pdf

Contact Information

LANXESS Solutions US Inc.

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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.