

Sources of Exposure

Toxicokinetics and Biomonitoring

Biomarkers/Environmental Levels

General Populations

- It is unlikely that general population will be exposed to bis(chloromethyl)ether because it is only used in closed systems in the United States and it rapidly degrades in the environment.
- Exposure through water, food, or soil is unlikely to be significant.

Occupational Populations

- The most likely means of occupational exposure is inhalation of bis(chloromethyl)ether vapors during the production and use of chemicals such as chloromethyl methyl ether, in which bis(chloromethyl)ether may occur as a contaminant or be formed inadvertently.

Toxicokinetics

- No information on the toxicokinetics of bis(chloromethyl)ether in humans or animals is reported.
- It is expected that bis(chloromethyl)ether is rapidly degraded in the aqueous environment of tissues, forming formaldehyde and HCl.

NHANES Biomonitoring

- There are no data regarding levels of bis(chloromethyl)ether in the general population.

Biomarkers

- There are no specific exposure biomarkers for bis(chloromethyl)ether.

Environmental Levels

Air

- There are no recent monitoring data for air levels bis(chloromethyl)ether in the United States.

Water

- There are no recent monitoring data for water levels of bis(chloromethyl)ether in the United States.

Sediment and Soil

- There are no monitoring data for levels of bis(chloromethyl)ether in the sediment or soil in the United States.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2017. Toxicological Profile for Bis(chloromethyl)ether. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™ for Bis(Chloro- methyl)Ether



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U.S. Department of Health and
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Agency for Toxic Substances
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www.atsdr.cdc.gov



ATSDR
AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

Bis(chloromethyl)ether

- Bis(chloromethyl)ether is a colorless liquid with a strong, unpleasant odor. It dissolves easily in water and readily evaporates into air.
- Bis(chloromethyl)ether was used in the production of several types of polymers, resins, and textiles; however, most of these uses have stopped.
- Currently, bis(chloromethyl)ether is only used in small amounts in fully enclosed systems in manufacturing facilities.
- Small quantities may be formed as an impurity during the production of chloromethyl methyl ether.

- Inhalation – Most likely route of exposure for the general and occupational populations.
- Oral – Not a likely route of exposure for the general or occupational populations.
- Dermal – Not a likely route of exposure for the general or occupational populations.

Bis(chloromethyl)ether in the Environment

- Due to the relatively short half-life of bis(chloromethyl)ether in both air and water, it is unlikely that significant transport or partitioning between media occurs.
- In the air, bis(chloromethyl)ether is primarily degraded by reacting with photochemically-generated free hydroxyl radicals or by hydrolysis.
- In water, bis(chloromethyl)ether is rapidly hydrolyzed, with a half-life of approximately 38 seconds.
- It is expected that bis(chloromethyl)ether would rapidly hydrolyze upon contact with moisture in soil or would react with soil constituents and therefore not persist for significant periods in the soil.
- Because bis(chloromethyl)ether is rapidly hydrolyzed, it will not bioaccumulate.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- No acute- (≤ 14 days) or chronic (≥ 365 days) duration inhalation MRLs were derived for bis(chloromethyl)ether.
- An intermediate duration (15–364 days) inhalation MRL of 0.0003 ppm was derived for bis(chloromethyl)ether.

Oral

- No acute- (≤ 14 days), intermediate- (15–364 days), or chronic (≥ 365 days) duration oral MRLs were derived for bis(chloromethyl)ether.

Health Effects

- In animals, inhalation of bis(chloromethyl)ether resulted in respiratory effects (distress, increased lung weight, pneumonitis, and tracheal and bronchial hyperplasia) after acute and intermediate duration.
- Neurological effects such as extreme irritability was seen in rats and hamsters after inhalation exposure.
- Lung cancer has been associated with occupational exposure to bis(chloromethyl)ether.
- Nasal and lung tumors have been seen after inhalation exposure, and skin cancer has developed after dermal exposure in animals.
- Bis(chloromethyl)ether has been classified by the U.S. Department of Health and Human Services, the U.S. Environmental Protection Agency, and by the International Agency for Research on Cancer as a human carcinogen.

Children's Health

- It is not known if children are more sensitive to bis(chloromethyl)ether exposure than adults.