

Chloromethyl methyl ether

107-30-2

Hazard Summary

Chloromethyl methyl ether is used in some chemical manufacturing processes. Acute (short-term) inhalation exposure causes severe irritation of the skin, eyes, mucous membranes, and respiratory tract, pulmonary edema, and pneumonia in humans. Chronic (long-term) inhalation exposure may cause chronic bronchitis in humans. Numerous case reports and epidemiological studies have reported increased incidences of respiratory cancer in workers occupationally exposed to chloromethyl methyl ether. Increased incidences of lung tumors have been observed in mice, rats, and hamsters exposed by inhalation. EPA has classified chloromethyl methyl ether as a Group A, known human carcinogen.

Please Note: The main source of information for this fact sheet is EPA's Integrated Risk Information System (IRIS) (3), which contains information on the carcinogenic effects of chloromethyl methyl ether. Other secondary sources include Hazardous Substances Data Bank (HSDB) (2), a database of summaries of peer-reviewed literature, and the Registry of Toxic Effects of Chemical Substances (RTECS), a database of toxic effects that are not peer reviewed. (4)

Uses

- Chloromethyl methyl ether is used in the synthesis of chloromethylated compounds and as an alkylating agent and solvent used in the manufacture of water repellents, ion-exchange resins, and industrial polymers. (2,3,6)

Sources and Potential Exposure

- Most industrial operations involving chloromethyl methyl ether are carried out in closed process vessels so that occupational exposure is minimized. (1)

Assessing Personal Exposure

- No information was located regarding the measurement of personal exposure to chloromethyl methyl ether.

Health Hazard Information

Acute Effects:

- Acute inhalation exposure causes severe irritation of the skin, eyes, mucous membranes, and respiratory tract and pulmonary edema and pneumonia in humans. Symptoms include sore throat, difficulty breathing, fever, chills, and severe skin and eye irritation. (1-3)
- Acute animal tests in rats, mice, and hamsters have demonstrated chloromethyl methyl ether to have **high** to **extreme** acute toxicity from inhalation exposure. (4)

Chronic Effects (Noncancer):

- Chronic inhalation exposure may cause chronic bronchitis in humans. (2)
- EPA has not established a Reference Concentration (RfC) or a Reference Dose (RfD) for chloromethyl methyl ether. (3)

Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of chloromethyl methyl ether in humans or animals.

Cancer Risk:

- Numerous case reports and epidemiological studies have reported increased incidences of respiratory cancer in workers occupationally exposed to chloromethyl methyl ether. (2,3,5)
- Increased incidences of lung tumors have been observed in mice, rats, and hamsters exposed by inhalation. (2,3,5)
- EPA has classified chloromethyl methyl ether as a Group A, known human carcinogen. (3)

Physical Properties

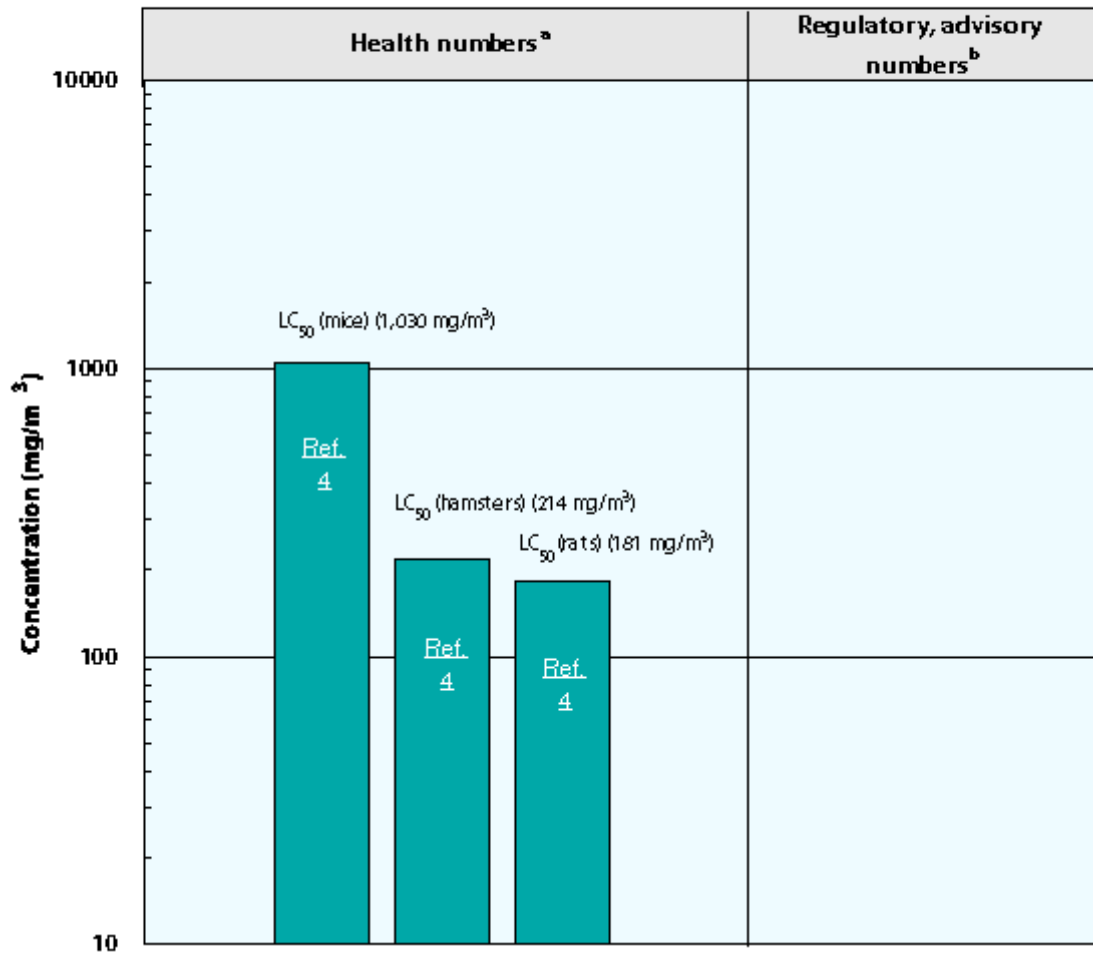
- The chemical formula for chloromethyl methyl ether is C_2H_5ClO , and its molecular weight is 80.51 g/mol. (6)
 - Chloromethyl methyl ether occurs as a colorless, flammable, highly volatile liquid that decomposes in water. (1-3)
 - Chloromethyl methyl ether has an irritating odor; the odor threshold has not been established. (2,3)
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Conversion Factors:

To convert concentrations in air (at 25°C) from ppm to mg/m^3 : $mg/m^3 = (ppm) \times (\text{molecular weight of the compound}) / (24.45)$. For chloromethyl methyl ether: $1 \text{ ppm} = 3.29 \text{ mg}/m^3$.

Health Data from Inhalation Exposure

Chloromethylmethylether



LC₅₀ (Lethal Concentration₅₀)--A calculated concentration of a chemical in air to which exposure for a specific length of time is expected to cause death in 50% of a defined experimental animal population.

The health values cited in this factsheet were obtained in December 1999.

^a Health numbers are toxicological numbers from animal testing or risk assessment values developed by EPA.

^b Regulatory numbers are values that have been incorporated in Government regulations, while advisory numbers are nonregulatory values provided by the Government or other groups as advice.

Summary created in April 1992, updated in January 2000

References

1. M. Sittig. Handbook of Toxic and Hazardous Chemicals and Carcinogens. 2nd ed. Noyes Publications, Park Ridge, NJ. 1985.
2. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
3. U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on Chloromethyl methyl ether. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.
4. U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
5. International Agency for Research on Cancer (IARC). IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Aromatic Amines, Hydrazine and Related Substances, N-

Nitroso Compounds and Miscellaneous Alkylating Agents. Volume 4. World Health Organization, Lyon. 1974.

6. The Merck Index. An Encyclopedia of Chemicals, Drugs, and Biologicals. 11th ed. Ed. S. Budavari. Merck and Co. Inc., Rahway, NJ. 1989.
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