

## CHLOROMETHYL METHYL ETHER

Chloromethyl methyl ether is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 107-30-2

$\text{ClCH}_2\text{OCH}_3$

Molecular Formula:  $\text{C}_2\text{H}_5\text{ClO}$

Chloromethyl methyl ether is a flammable, highly volatile, colorless liquid with an irritating odor (U.S. EPA, 1994a). It is miscible with ethanol, ether, acetone, chloroform, and many other organic solvents (HSDB, 1991). Chloromethyl methyl ether decomposes in water (Sax, 1987). A reaction with divalent metals forms a very reactive product. Chloromethyl methyl ether is a dangerous fire hazard when exposed to heat or flame and emits toxic fumes of chlorine when heated to decomposition (Sax, 1989).

### Physical Properties of Chloromethyl Methyl Ether

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Synonyms: chloromethoxymethane; methyl chloromethyl ether; monochloromethyl ether; chlorodimethyl ether; dimethylchloroether; CMME

Molecular Weight:	80.51
Boiling Point:	59 °C
Melting Point:	-103.5 °C
Flash Point:	< 73.4 °F
Vapor Density:	0.5245 lb/ft <sup>3</sup> at 70 °F (air = 1)
Density/Specific Gravity:	1.0605 at 20/4 °C (water = 1)
Vapor Pressure:	3.705 lb/in <sup>2</sup> at 70 °F
Log Octanol/Water Partition Coefficient:	Hydrolyzes instantly in water
Conversion Factor:	1 ppm = 3.29 mg/m <sup>3</sup>

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(HSDB, 1991; Merck, 1989; Sax, 1989; U.S. EPA, 1994a)

## SOURCES AND EMISSIONS

### A. Sources

Chloromethyl methyl ether is used as a chemical intermediate, an alkylating agent and solvent in the manufacture of water repellents and ion-exchange resins, and in the synthesis of chloromethylated compounds (HSDB, 1991).

## B. Emissions

No emissions of chloromethyl methyl ether from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1995a).

## C. Natural Occurrence

Chloromethyl methyl ether has been reported not to occur in nature (HSDB, 1991).

## **AMBIENT CONCENTRATIONS**

No Air Resources Board data exist for ambient measurements of chloromethyl methyl ether.

## **INDOOR SOURCES AND CONCENTRATIONS**

No information about the indoor sources and concentrations of chloromethyl methyl ether was found in the readily-available literature.

## **ATMOSPHERIC PERSISTENCE**

Chloromethyl methyl ether will hydrolyze in humid air with an estimated half-life of 3.5 minutes to 6.5 hours. However, results suggest that the hydrolysis is surface-catalyzed and therefore, may not represent the true half-life in atmospheric room air or outside air (HSDB, 1991). Based on the hydroxyl radical reaction rate constant, the atmospheric half-life of chloromethyl methyl ether is estimated to be 2.4 days (Kwok and Atkinson, 1995).

## **AB 2588 RISK ASSESSMENT INFORMATION**

Although chloromethyl methyl ether is reported as being emitted in California from stationary sources, no health values (cancer or non-cancer) are listed in the California Air Pollution Control Officer Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines for use in risk assessments (CAPCOA, 1993).

## **HEALTH EFFECTS**

The probable route of human exposure to chloromethyl methyl ether is inhalation (U.S. EPA, 1994a).

Non-Cancer: Inhalation exposure to chloromethyl methyl ether may cause severe skin, eyes, nose, throat, and respiratory tract irritation. Short-term exposure may cause pulmonary edema and pneumonia. Long-term inhalation exposure may cause chronic bronchitis. The United States

Environmental Protection Agency (U.S. EPA) has not established an oral Reference Dose (RfD) for chloromethyl methyl ether, and a Reference Concentration (RfC) is under review. No information is available on the adverse developmental and reproductive effects of chloromethyl methyl ether in humans or animals (U.S. EPA, 1994a).

Cancer: Numerous case reports and epidemiological studies have reported increased incidences of respiratory cancer in workers occupationally exposed to chloromethyl methyl ether. The U.S. EPA has classified chloromethyl methyl ether as Group A: Known human carcinogen (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified chloromethyl methyl ether as Group 1: Human carcinogen (IARC, 1987a).

The State of California has determined under Proposition 65 that chloromethyl methyl ether is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is  $6.9 \times 10^{-4}$  (microgram per cubic meter)<sup>-1</sup> (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to 1 microgram per cubic meter of chloromethyl methyl ether is estimated to be no greater than 690 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is 2.4 (milligram per kilogram per day)<sup>-1</sup> (OEHHA, 1994).

