

METHYLENE CHLORIDE
(CH₂Cl₂) CAS # 75-09-2 (Metal)

Synonyms include dichloromethane, methylene bichloride, methane dichloride, and methylene dichloride.

SOURCE/USE

Methylene chloride is a solvent in paint and varnish strippers and in degreasing agents. It is used in the production of photographic films, synthetic fibers, pharmaceuticals, adhesives, inks, and printed circuit boards. In the food industry, it has been used as an extractant to remove caffeine and edible fats from coffee, drugs, and foods. It is employed as a propellant for polyurethane foams, insecticides, hair sprays, and paints. It also serves as a refrigerant.

ROUTES OF EXPOSURE

Inhalation is the most important route of exposure and methylene chloride vapor is absorbed readily from the lungs. Although the risk of off-post acute exposure to methylene chloride as a result of remediation at the Rocky Mountain Arsenal is very small, any such exposure would very likely be via inhalation. Also, the concentrations resulting in acute clinical effects discussed in this document reflect occupational exposures and are much higher than those likely to be encountered at the fence line during remediation at the RMA. Odor is an adequate warning property for acute, high-dose exposures but may not be adequate for prolonged exposures. Methylene chloride is heavier than air and may cause asphyxiation in enclosed, poorly ventilated, or low-lying areas. Methylene chloride vapor can cause skin and eye irritation and burns. It is absorbed slowly though intact skin but probably not in quantities that cause acute systemic toxicity.

APPLICABLE STANDARDS AND LIMITS	
ATSDR acute MRL	Acute 2.08 mg/m ³ Intermediate 1.04 mg/m ³ Chronic 1.04 mg/m ³
ATSDR intermediate MRL	0.1 mg/m ³
OSHA PEL	1735 mg/m ³
OSHA STEL	6950 mg/m ³
Odor threshold	790 mg/m ³
RMA acute fence line criteria	ARC - 5.9 mg/m ³ MARC - 56.0 mg/m ³
RMA chronic fence line criteria	Cancer - 5.8 µg/m ³

APPLICABLE STANDARDS AND LIMITS	
	Noncancer - 3000 $\mu\text{g}/\text{m}^3$

The goal of the remediation is exposure prevention through remedial design, environmental monitoring, and modeling. Failure of prevention could result in acute and/or chronic exposures. Following is an overview of the types of health effects associated with methylene chloride exposure.

ACUTE HEALTH EFFECTS

Methylene chloride exposure causes dose-related CNS depression. Typical acute symptoms include headache, drowsiness, lightheadedness, slurred speech, decreased alertness, slowed reaction time, irritability, impaired gait, and stupor. Rapid loss of consciousness, coma, seizures, and death were reported.

Victims of acute, high-level inhalation exposure may suffer airway irritation, inflammation of the lungs, and accumulation of fluid in the lungs.

Methylene chloride may cause acute cardiovascular effects including decreased contractility of heart muscle; increased heart rate, and lowered threshold of the heart muscles to the effects of epinephrine, potentially increasing the risk of an abnormal heart rhythm. Elevated carboxyhemoglobin and carboxymyoglobin levels may cause insufficient oxygen supply to the heart in persons who have preexisting coronary disease.

Methylene chloride causes skin irritation and blistering. Prolonged contact may result in second- and third degree chemical burns.

High concentrations of methylene chloride vapor may cause eye irritation and tearing. When splashed in the eye, methylene chloride can cause burning pain, inflammation of the eye surface, and inflammation of the iris.

CHRONIC HEALTH EFFECTS

Chronic occupational exposure to various solvents, including methylene chloride, is associated with chronic neurologic effects such as memory loss with intellectual impairment and balance disturbances. Irritant contact dermatitis manifested by inflammation and hives was noted in workers who have chronic skin exposure.

The EPA determined that methylene chloride is a probable human carcinogen.

There is no evidence that methylene chloride is a reproductive or developmental toxicant.