

MIOSHA Fact Sheet

Methylene Chloride

Bathtub Refinishing Operations



Since 2006, three bathtub refinishers have died in Michigan. Nationwide, since 2000, at least 13 refinishers have died due to overexposures from methylene chloride-based strippers. In Michigan, the affected refinishers were using commercially available products that contained 60-100% methylene chloride. None of the Michigan refinishers wore proper respiratory protection, eye, and hand protection; or utilized proper ventilation.

Bathtub refinishing work practices that utilize methylene chloride-based strippers can result in excessive airborne concentrations of methylene chloride. Employee's exposure to methylene chloride is covered under the MIOSHA Occupational Health Standard, [Occupational Health Standards Part 313 Methylene Chloride](#). Requirements of this standard include air monitoring, implementation of engineering controls for overexposures, establishment of a regulated work area, utilizing proper personal protective equipment, medical surveillance, and proper training to affected workers.

Methylene Chloride

Methylene chloride (CAS# 75-09-2) is used as a solvent in paint removers, degreasers and in bathtub refinishing. Alone, it is a colorless liquid with a chloroform-like odor that is slightly soluble and capable of forming a homogeneous mixture when added to most organic solvents. A common synonym for methylene chloride is dichloromethane.

Methylene chloride's primary route of entry is inhalation but can also affect the body if liquid comes into contact with the eyes or skin, or if it is swallowed. The principal acute hazardous effects are depressant action of the central nervous system, and possible cardiac and liver toxicity. Central nervous systems effects can range from decreased hand/eye coordination to narcosis and death. Cardiac toxicity is due to the metabolism of methylene chloride to carbon monoxide. Carbon monoxide displaces oxygen in the blood resulting in decreased oxygen available to the heart tissue, thus increasing the risk of damage to the heart which can result in heart attacks for susceptible individuals (individuals with heart disease and those with risk factors for heart disease).

Methylene chloride has been tested for carcinogenicity in several laboratory rodents. These studies indicated clear evidence that methylene chloride is carcinogenic to male and female mice and female rats. Based on these epidemiologic studies, OSHA has concluded that there is suggestive evidence of increased cancer risk in methylene chloride related worker populations. As a result, OSHA considers methylene chloride as a suspected human carcinogen. The National Institute for Occupational Safety and Health (NIOSH) regards methylene chloride as a potential occupational carcinogen, and the International Agency for Research Cancer (IARC) classifies it as an animal carcinogen.

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If you are using a methylene chloride-based stripper, at a minimum, you must do the following to protect yourself and your employees from being overcome by the vapors:

- If possible, avoid using methylene chloride-based strippers. Try substitution with a non-methylene chloride-based product.
- Establish fresh make-up air and local exhaust ventilation.
- Utilize proper respiratory protection. This protection includes tight-fitting, pressure-demand full-face air supplied respirators when applying and removing methylene chloride-based strippers. Dust masks and cartridge respirators do not provide adequate protection from methylene chloride vapors.
- Use butyl rubber or polyvinyl alcohol (PVA) gloves. Latex or nitrile gloves will not provide adequate protection.
- Review the material safety data sheet and provide training to affected employees, as required by the Part 313 Methylene Chloride standard and the [Occupational Health Standards Part 430 Hazard Communication](#) standard.

Additional Information on Methylene Chloride Exposure during Bathtub Refinishing:

- The 8-hour permissible exposure limit to methylene chloride is 25 parts per million (ppm). The 15-minute short term exposure limit is 125 ppm. When used in an uncontrolled setting, typical exposure to methylene chloride during bathtub refinishing using 60-100% methylene chloride-based stripper and could be estimated to be in the thousands of ppm.
- Methylene chloride is heavier than air. When not properly exhausted, vapors can accumulate in poorly ventilated areas and inside the tub and can potentially reach deadly levels.
- In liquid form, it is heavier than water and it may become trapped under a layer of undisturbed water.
- Methylene chloride can be absorbed through the skin.
- Overexposure to methylene chloride occurs before its odor can be detected!
- In addition to its direct toxic effect, the human body metabolizes methylene chloride into carbon monoxide, which is toxic and can also cause death!

For additional training and assistance, please contact MIOSHA Consultation Education and Training at www.michigan.gov/cetrca.