MISSISSIPPI STATE UNIVERSITY™
ENVIRONMENTAL HEALTH AND SAFETY

Methylene Chloride / Dichloromethane (DCM)

REFERENCE GUIDE

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The EPA has issued a final rule regulating methylene chloride (dichloromethane, DCM; CAS #75-09-2) under the Toxic Substances Control Act (TSCA). The EPA methylene chloride regulations prompt the following actions:

- Prohibits manufacturing, processing and distribution of methylene chloride for all consumer uses.
- Prohibits most industrial and commercial uses of methylene chloride, including paint and coating removers. Consumer paint and coating removal was prohibited in 2019.
- Creates strict workplace protections through a Workplace Chemical Protection Program to ensure that for the remaining uses, workers will not be harmed by methylene chloride use.
- Requires manufacturers (including importers), processors, and distributors to notify companies to whom methylene chloride is shipped of the prohibitions and to maintain records.

Why is the EPA regulating methylene chloride?

The EPA determined that methylene chloride presents an unreasonable risk to human health. Methylene chloride is classified as a potential human carcinogen and is toxic to the central nervous system and the liver. Exposure to methylene chloride can occur from inhalation and skin absorption.

How are commercial/industrial products containing methylene chloride impacted?

EPA regulations now prohibit most industrial and commercial uses of methylene chloride. Products containing methylene chloride, outside of MSU EH&S authorized laboratory research applications, ***must be discontinued***. Commercial and industrial products that contain methylene chloride must be properly disposed of as hazardous waste. To submit a hazardous waste pickup request, please submit an EH&S Hazardous Waste Pickup Ticket. Common industries and applications that have utilized methylene chloride include:

- **Paint and Coatings:** a key ingredient in many paint and coating removers, including those used for stripping paint from surfaces.
- **Adhesives and Sealants:** used in the production of certain adhesives and sealants.
- **Metal Cleaning and Degreasing:** used as a solvent for cleaning and degreasing metal parts.
- **Aerosol Propellants:** found in aerosol products, such as some spray paints.
- **Cleaning and Furniture Care:** used in commercial cleaning products and furniture care products.
- **Automotive Care:** used in automotive cleaning products and degreasers.
- **Food Processing:** used in the processing of decaffeinated coffee, spice extracts, and hops extract.
- **Pharmaceuticals:** used in the manufacturing of some pharmaceuticals.
- **Cosmetics:** used in cosmetic products, such as nail polish removers.

Do EPA methylene chloride regulations apply to academic research labs?

This regulation applies to all research, government, academic, industrial, and commercial laboratories. ***There is no research exemption.*** Additionally, this regulation applies to all potentially exposed laboratory personnel, including students, interns, and visitors.

What actions are needed to comply with EPA methylene chloride regulations?

The EPA has implemented a compliance timeline for the implementation of the methylene chloride Workplace Chemical Protection Program (WCPP).

Compliance Timelines* for the Workplace Chemical Protection Program

Initial Monitoring	Exposure Limits and Dermal Protections	Exposure Control Plan	Other Monitoring
Complete initial monitoring. Demarcate regulated area within 3 months of initial monitoring data. Provide respiratory protection within 3 months of initial monitoring data but no later than 15 months after final rule. Existing Facilities Before **May 5, 2025** (360 days after final rule publication). New Facilities Within 30 days of initiating use.	Ensure methylene chloride inhalation exposures do not exceed the ECEL (2 ppm as an 8-hr TWA) and EPA STEL (16 ppm as a 15-min TWA) for all potentially exposed persons. Provide respiratory and/or dermal protection if applicable. Existing Facilities Before **August 1, 2025** (450 days after final rule publication). New Facilities Within 90 days of initial exposure monitoring.	Develop and implement an exposure control plan. Notify potentially exposed persons of completion of exposure control plan within 30 days of its completion. Provide requested records by a potentially exposed person within 15 days of request. Existing Facilities Before **October 30, 2025** (540 days after final rule publication). New Facilities Update as necessary, but at least every five years.	Periodic Monitoring Conduct at a minimum **every 5 years, but could occur as frequently as every 3 months,** dependent upon initial monitoring results. As Needed Monitoring Conduct additional monitoring after any change that may introduce additional sources of methylene chloride exposure or result in a change in exposure levels.

* Longer timeframes for Federal agencies and contractors acting for or on behalf of those agencies. See final rule for details.

What is required to continue using methylene chloride in a laboratory setting?

Under the WCPP, we are required to:

- Meet the exposure limits for methylene chloride established by the EPA.
- Conduct exposure monitoring for all potential methylene chloride exposures.
- Establish a regulated area when airborne concentrations of methylene chloride exceed, or there is a reasonable possibility they may exceed the exposure limits.
- Develop and implement a methylene chloride exposure control plan that identifies the controls that will be used to reduce exposures to below the exposure limits.

Exposure Limit	Description	EPA
8-hour time-weighted average (TWA)	Average concentration over 8-hour period	2 ppm
15-minute short term exposure limit (STEL)	Average concentration over 15-minute period	16 ppm

How can I reduce my exposure to methylene chloride?

As mentioned previously, exposure to methylene chloride can occur from inhalation and skin absorption. It is important that control measures are in place to prevent both inhalation and skin contact. Methods for controlling methylene chloride exposure are listed below in order of most effective to least effective:

Elimination or Substitution
If possible, eliminate the use of methylene chloride or replace methylene chloride with a safer alternative. If you are able to eliminate the use of methylene chloride in your lab, submit a waste pickup request via the EH&S Hazardous Waste Pickup Ticket and remove methylene chloride from your chemical inventory.

Engineering Controls
When elimination or substitution is not feasible, engineering controls are the next most effective control method. Chemical fume hoods are the most common engineering control found in laboratories. Work with methylene chloride in a fume hood, whenever possible. If a fume hood is not available or is not able to be used for a specific application, consult with EH&S to assist with identifying appropriate alternative controls.

Administrative Controls
Implement work practices that reduce the quantity of methylene chloride used, the duration of exposure, and/or the frequency of use if possible. Work must adhere to any stipulations outlined in the WCPP along with lab-specific SOPs.

Personal Protective Equipment (PPE)
Unfortunately, PPE for methylene chloride is not straightforward. Many common glove materials do not provide protection from methylene chloride, including nitrile, latex, neoprene, and butyl rubber. Methylene chloride permeates disposable nitrile gloves within one minute. As such, **nitrile gloves are not suitable for handling methylene chloride**; rather, polyvinyl alcohol (PVA) or poly-laminate are acceptable alternatives. Contact EH&S for additional glove selection assistance.

Respiratory protection is not a viable option for controlling inhalation exposures to methylene chloride in a laboratory setting. Filter cartridge respirators cannot be used because methylene chloride can pass through the cartridge leaving respirator wearers unprotected.

How do I find substitutes for methylene chloride?

Substitutes for methylene chloride may be available depending on your application. The American Chemical Society (ACS) has several tools available to assist with identifying substitutes on their DCM Alternatives & Resources webpage. Please be aware that some substitutes may introduce a different hazard, such as flammability. EH&S is available to consult with you as you identify substitutes to ensure any new hazards are identified and properly controlled. Although there is no universal substitute, some potential alternatives include:

- For chromatography: THF, EtOAc, iPrOAc, MEK
- For reactions: iPrOAc, THF, MeTHF
- For NBS brominations: carbon tetrachloride, chloroform, benzene
- For extractions: THF, MEK, CAN, MeTHF, IPrOAc, and higher ketones

What is exposure monitoring and how will this be performed?

Exposure monitoring measures a person's exposure to airborne chemicals during use. There are several different methods for conducting exposure monitoring, and the method selected will be based on the specific use scenario. As with other exposure monitoring that is facilitated by EH&S, investigators/departments are responsible for covering costs associated with the services rendered.

I only use methylene chloride in a fume hood. Is exposure monitoring necessary?

Yes, the EPA has stated that while a properly working fume hood should be sufficient to control methylene chloride exposures, exposure monitoring is needed to demonstrate protection.

What information will EH&S need to conduct required exposure monitoring?

If you have methylene chloride or methylene chloride containing compounds/products, please complete the EH&S Methylene Chloride Declaration Form. Upon submission, EH&S will coordinate downstream actions.