National Institutes of Health
Office of Management

Methylene Chloride Safety

Division of Safety (DS), Industrial Hygiene and Campus Safety Branch (IHCSB)

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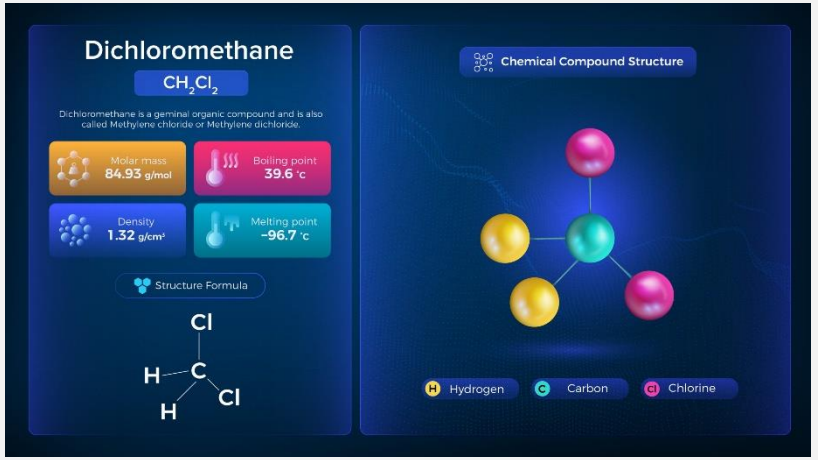
What is Methylene Chloride?

Methylene chloride: also known as Dichloromethane or DCM

- Volatile chemical widely used in industrial, commercial, and research applications

- **Acute Toxin:** Neurotoxicity effects are the most serious adverse effects of acute inhalation and dermal exposures of DCM. High levels of exposure can cause dizziness that can result in sudden loss of consciousness or death.
  - Acute exposure resulted in at least 88 occupational deaths in the U.S. between 1985-2024.

- **Carcinogen:** Class 1B carcinogen.



Carcinogen

Acute Toxin

New EPA Regulation

EPA's final rule will:

- Prohibit manufacture, processing, and distribution of methylene chloride for all consumer uses (in almost all cases, alternatives are available)
- Require a Workplace Chemical Protection Program (WCPP) for 13 specified conditions of use, primarily research uses
- Require exposure monitoring for exempted users
- Establish recordkeeping and downstream notification requirements

EPA Methylene Chloride Rule (issued under the Toxic Substances Control Act (TSCA), in 40 CFR Part 751)

Ban of Industrial and Commercial Uses of DCM

- Solvent for vapor degreasing
- Solvent for cold cleaning
- Solvent for aerosol spray degreaser/cleaner
- Use in paints and coatings and removers
- Use in adhesive and caulk removers
- Use in metal aerosol and non-aerosol degreasers
- Use in finishing products for fabric, textiles, and leather

Ban all the uses of DCM including products that contain DCM as part of the composition. Example: Rust-Oleum Wood Stripper/Stripper- 25% DCM

Final Regulation: Chemical Exposure Limits

Employers continuing the use of DCM for the exempted activities (e.g., research) must:

- Take appropriate actions to meet the ECEL new inhalation exposure limits
- Develop a **Workplace Chemical Protection Program (WCPP)** to protect people from occupational exposures.
- Participate in initial and period exposure monitoring.

Methylene Chloride (Dichloromethane) Exposure Limits

Chemical	8-Hour Limit TWA, ppm)	8-Hour Action Level	STEL (15-minute TWA, ppm)
Methylene Chloride	25 ppm OSHA PEL **2 ppm EPA ECEL***	1 ppm EPA AL	125 ppm OSHA STEL **16 ppm EPA STEL**

*Existing Chemical Exposure Limits (ECEL)
Two new limits from the EPA indicated in red font

Final Ruling: Workplace Chemical Protection Plan

A WCPP must be developed in compliance with EPA **guidance** and follow the framework:

- Detail new/current exposure limits
- Initial monitoring to determine if exposure is with ECEL
- Periodic monitoring every 3 months, 6 months, or 5 years, based on **the findings of the initial monitoring**
- Reduce exposures **using the** hierarchy of controls.
- Implement regulated DCM areas when applicable and required.
- Develop and communicate an exposure control plan
- Implementation of respirator program if controls are **ineffective in bringing exposures below ECEL**

Exposure Management – Hierarchy of Controls

Elimination and Substitution

Discontinue the use of dichloromethane/DCM and dispose of stored amounts if planning to discontinue the use.

Consider other available safer alternatives to substitute DCM for the existing procedures.

When substituting DCM review the process to ensure new hazards are not introduced.

Administrative/Work Practice controls

Develop SOP, DCM is a Particularly Hazardous Substance (PHS) by using DS provided chemical specific SOP template

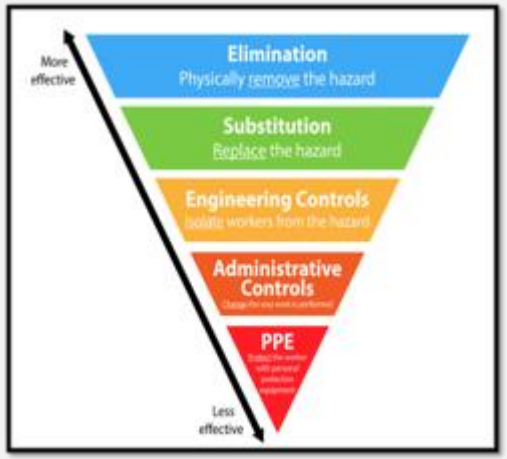
PI's and/or lab managers are responsible for providing training to personnel on how to work safely with DCM

Areas where DCM is used need to be labeled as a PHS designated area.

Engineering controls

Engineering controls like chemical fume hoods, LEVs etc. should be used to handle DCM

Ensure equipment is certified, DO NOT work with engineering controls that have failed certification.



Exposure Management – working safely in a CFH

Working safely in a chemical fume hood

- **Never work** with DCM, or any hazardous chemical, in a hood that is malfunctioning or has failed certification.
- Cover the hood surfaces with plastic-backed absorbent pads
- During set up, lower the sash to the right height (marked by the green sticker) to provide splash protection. After set up bring the sash as low as possible.
- Equipment/setup should be at least six inches behind the sash opening. Avoid working at the edge.
- Label the hood with "Danger-Carcinogen/acute toxin" if you are working with PHS.
- Clean the hood and put way chemicals/equipment upon completion of tasks. Never use hood for the storage of chemicals/waste.

Example CFH with proper working set up

Exposure Management – PPE

Minimum PPE: buttoned lab coat, safety goggles, protective clothing (long pants, closed toe shoes), and gloves

- DCM penetrates nitrile gloves in less than 10 minutes, double gloving should be implemented
  - Working with small quantities, double glove with nitrile or nitrile and neoprene combination gloves (e.g., Ansell 93-260)
  - Work with large quantities/spill cleanup-Ansell 2-100 liners or SilverShield gloves under a nitrile or nitrile and neoprene combination glove
  - All PPE should be changed immediately following contamination
- If exposure is above EPA limits respiratory protection may be necessary.

Safety Committee Responsibilities

Assess: Do labs within your IC use DCM? What are the uses and who are the users?

Consider substitution: Are there substitutes available for the proposed use? Encourage the use and purchase of these within your IC

Talk to laboratories: Communicate the requirements to continue the use of DCM and spread information regarding WCPP

Lab Responsibilities

Assess the need: Does your lab work with DCM? What are the uses and who are the users?

Consider substitution: Are there substitutes available for the proposed use? Conduct a risk assessment on these solvents

Talk to your Safety Specialist: Communicate your intent to continue the use of DCM, establishing WCPP, and begin monitoring

Steps to Take for Laboratories

Any laboratory wishes to continue to use DCM must:

- Contact DS and complete the initial assessment
- Develop chemical specific SOPs and follow hierarchy of control for exposure management
- Schedule initial exposure monitoring with DS. If necessary (based on the initial monitoring data), DS will:
  - Establish periodic monitoring plan
  - Establish regulated areas if/when monitoring shows exposures exceeding or suspected to exceed EPA allowable limits.
  - Recommend additional PPE like respirators
  - Provide additional training
- Review the DS Working safely with DCM fact sheet