

Methylene Chloride

Workplace Chemical Protection Program

Definitions, Roles and Responsibilities

- **As needed monitoring** - Exposure measurements taken when there is a change of use.
- **De minimis** - The threshold concentration for which regulatory restrictions are not required. For DCM this concentration is 0.01% by weight.
- **Exposure Control Plan (ECP)** - This documents actions taken to mitigate occupational exposures and comply with the WCPP at the lab, department, or institute level.
- **Owners / operators** - Anyone who owns, leases, operates, controls, or supervises a workplace. This includes Montana State University and each PI, instructor, or supervisor who oversees a location where DCM is used or a person who uses DCM. Montana State University is responsible for writing and updating this Program. PIs, instructors, and supervisors are responsible for implementing this Program and for approving and enforcing any Exposure Control Plans applicable to their work area.
- **Periodic monitoring** - Dependent upon the results of the initial and/or repeat monitoring; the frequency for gathering new monitoring data ranges from 3 months to 5 years.
- **Potentially exposed person** - Any person who may be exposed to a chemical or mixture in a workplace as a result of a condition of use of that chemical substance or mixture. This applies regardless of whether a person is a user of the chemical or an employee. Potentially exposed persons are responsible for complying with the provisions of this Program.
- **Prohibited uses** - the EPA has established exposure limits for DCM for some conditions of use, including “use as a laboratory chemical.” Nearly all other commercial and industrial uses, such as use as a solvent or paint remover, are prohibited. EPA has a full list of prohibited uses in its [Guide to Complying with the 2024 Methylene Chloride Regulation](#).
- **Regulated area** - An area demarcated where airborne concentrations exceed, or there is a reasonable possibility they may exceed, the Existing Chemical Exposure Limit (ECEL) of 2 ppm or EPA Short Term Exposure Limit (STEL) of 16 ppm.
- **Retailer** - An entity that distributes or makes available products to consumers.
- **Time-Weighted Average (TWA)** - The potentially-exposed person's average airborne exposure in any 8-hour work shift of a 40-hour work week (8-hour TWA), or in any 15-minute reference period covering a specific task where airborne concentrations may instantaneously exceed the full-shift exposure limit (15-minute TWA).

- **Workplace Chemical Protection Program (WCPP)** - A written program to protect potentially exposed persons in the workplace who are engaged in conditions of use that are not prohibited.

Exposure Limits

Under this program, long-term exposures to DCM will be kept below 2 ppm (8-hour TWA) and short-term exposures will be kept below 16 ppm (15-minute TWA). Additional monitoring will be implemented whenever long-term exposures exceed 1 ppm. Any deviation from these limits must be reviewed by Safety and Risk Management and will be documented in a written Exposure Control Plan. This documentation will include a respiratory protection program to be implemented in work areas receiving a variance.

Exposure Monitoring

Monitoring Requirements

Initial monitoring for DCM is required to establish a baseline for DCM users and to inform the development of the Exposure Control Plan (ECP). All initial monitoring shall be coordinated by Safety and Risk Management, or within 30 days after the approval of DCM in the workplace. Initial monitoring results will be used to determine the frequency of compliance activities such as periodic monitoring. Monitoring must be taken when and where operating conditions are best representative of each potentially exposed person's highest likely full shift and 15-minute exposures occur.

Exemptions to Initial Monitoring

Two conditions can exempt an employer from conducting initial monitoring for DCM.

1. If objective data generated during the last 5 years demonstrates DCM is not released in the workplace environment at or above the ECEL action level and EPA STEL and with initial monitoring conducted within 5 years of that data.
2. If exposure to DCM is less than 30 days per year with two conditions:
 - a. Direct reading measurements must be taken in the environment to ensure levels are below the ECEL action level and EPA STEL.
 - b. Appropriate controls must be put in place to ensure levels are below the ECEL and EPA STEL.

Initial and Periodic Monitoring

The results of initial monitoring will determine how frequently periodic monitoring must occur. Periodic monitoring can range from every 3 months, every 6 months or every 5 years depending on the following conditions:

Determine monitoring frequency based on initial monitoring results.

DCM Concentration (exposure monitoring results)			Re--monitoring Frequency
8-hr TWA (ECEL)		15-min TWA (STEL)	
< 1 ppm	and	≤ 16 ppm	ECEL and EPA STEL periodic monitoring at least once every 5 years
< 1 ppm	or	> 16 ppm	ECEL monitoring at least once every 5 years AND EPA STEL periodic monitoring required every 3 months
> 1 ppm & ≤ 2 ppm	or	< 16 ppm	ECEL monitoring every 6 months
> 1 ppm & ≤ 2 ppm	or	> 16 ppm	ECEL periodic monitoring every 6 months AND immediate suspension of tasks causing the 15-min TWA to exceed 16 ppm in the monitored lab
> 2 ppm	or	> or ≤ 16 ppm	Immediate suspension of use of DCM in the monitored lab

Changes in Conditions

The frequency of periodic monitoring may be reduced if **two consecutive samples** taken at least **7 days apart** show the 8-hour TWA exposure has decreased from between 1 and 2 ppm to below 1 ppm.

Lifting of a suspension of DCM use similarly requires that **two consecutive samples** taken at least **7 days apart** show the 8-hour TWA exposure has decreased to below 2 ppm AND that the 15-minute TWA exposure has decreased to below 16 ppm.

Suspension of Periodic Monitoring

Monitoring may be suspended if work with DCM will not occur during the timeframe where monitoring would be required under this plan. In this case, the next use of DCM must be monitored. The PI, instructor, or lab supervisor who oversees the location where DCM is used is

responsible for notifying Safety and Risk Management in advance and may not proceed with use of DCM until monitoring has been scheduled.

Sampling Requirements

The following sampling guidelines must be followed by every potentially exposed person.

1. Sampling Requirements:
 - a. Sampling must be conducted for every potentially exposed person or a representative sample representing all exposed persons.
 - b. Sampling must be taken when and where the operating conditions are representative of full shift or experimental exposures.
 - c. All potentially exposed persons must be given the opportunity to observe exposure monitoring.
 - d. Must be taken at the personal breathing zone.
 - e. Notification of monitoring results to monitored person and potentially exposed persons (e.g., similar exposure group) within 15 working days after receipt of results.
2. Sampling Report:
 - a. Provide the ECEL, action level, EPA STEL, and significance of each.
 - b. Provide the quantity, location, and manner of DCM use at the time of monitoring.
 - c. Provide monitoring results.
 - d. Indicate whether the concentration exceeds the ECEL, action level, and EPA STEL.
 - e. Provide a description of actions taken to reduce exposure to below exposure limits.
 - f. Provide a description of the respiratory protection measures if needed.
 - g. List any identified releases of DCM during monitoring.

Exposure Control Plan

Common Language

Elimination

Use of DCM is allowed under this Program as a laboratory chemical and in waste operations to dispose of materials generated through other approved uses. These uses cannot be eliminated because of DCM's unique chemical properties and to ensure results from ongoing experiments can be compared with previously obtained experimental results. In accordance with EPA regulation, all uses not explicitly permitted under this Program shall be eliminated.

Centralized ECP for Laboratory Use

This Exposure Control Plan (ECP) covers safety practices to be followed for use of DCM as a laboratory chemical at Montana State University. Any deviation from this Plan requires approval in writing from the Safety and Risk Management. The use of DCM is subject to pre-approval by the Principal Investigator (PI) and/or Supervisor responsible

for the laboratory in which it will be used. DO NOT USE DCM UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL.

Substitution

The following substitutes must have been considered for DCM:

- ☐ 2-Methyltetrahydrofuran
- ☐ Cyclopentylmethyl ether
- ☐ Ethanol
- ☐ Ethyl acetate
- ☐ Isopropanol
- ☐ Methanol
- ☐ Methyl isobutyl ketone
- ☐ Methyl tert-butyl ether
- ☐ Toluene

Alcohols, methyl isobutyl ketone, and ethyl acetate cannot be substituted for DCM as a reaction solvent due to undesirable reactivity. Ethers cannot be substituted for DCM in column chromatography due to their high boiling points and the risk of peroxide formation. Toluene cannot be substituted for DCM in processes that require a polar solvent. Finally, any process that replicates previous work may continue to use DCM in order to maintain reproducibility and comparability of previous results.

Engineering Controls

Local exhaust ventilation must be used for all processes employing DCM. Acceptable controls include certified fume hoods, glove boxes, exhausted enclosures, and snorkels.

Administrative Controls

All occupants of laboratories that use DCM shall review this WCPP and ECP prior to entry, sign that they have received the information they contain, and agree to abide by the training provided to them.

Storage of DCM must be compliant with requirements for Particularly Hazardous Substances.

Stop all use of DCM if any malfunction of the local exhaust ventilation device indicated above is suspected.

Any PPE suspected of encountering DCM must be changed immediately.

Personal Protective Equipment (PPE)

DCM may only be handled while wearing a lab coat, safety glasses or splash goggles, and either polyvinyl alcohol gloves or double nitrile gloves. LLDPE laminate or butyl Viton gloves may be used for procedures involving strong oxidizing acids. Polyvinyl alcohol or LLDPE laminate gloves may be used for procedures involving significant risk of fire. PIs, instructors, and supervisors are responsible for final glove selection and supply.

Centralized ECP for Solvent Welding

This Exposure Control Plan (ECP) covers safety practices to be followed for use of a bonding agent that contains DCM for solvent welding at Montana State University. Any deviation from this Plan requires approval in writing from the Safety and Risk Management. The use of a bonding agent that contains DCM is subject to pre-approval by the Principal Investigator (PI) and/or Supervisor responsible for overseeing your work. DO NOT USE THE BONDING AGENT UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL.

Substitution

The following substitutes must have been considered for DCM:

- ☐ 2-Methyltetrahydrofuran
- ☐ Cyclopentylmethyl ether
- ☐ Ethanol
- ☐ Ethyl acetate
- ☐ Isopropanol
- ☐ Methanol
- ☐ Methyl isobutyl ketone
- ☐ Methyl tert-butyl ether
- ☐ Toluene

Engineering Controls

DCM will be used with the following engineering controls in place:

- ☒ Local Exhaust Ventilation
 - ☒ Fume hood
 - ☒ Glove box
- ☒ Splash shield

Administrative Controls

All potentially exposed persons using DCM at Montana State University shall review this WCPP and ECP prior to entry and sign that they have received the information they contain and agree to abide by the training provided to them.

DCM usage will be approved for specific processes and building/room numbers by SRM. All usage will be confined to the approved SOP.

DCM usage will be stored in approved storage locations under appropriate ventilation conditions as approved by SRM.

Stop all use of DCM if any malfunction of the local exhaust ventilation device indicated above is suspected.

Any PPE suspected of coming in contact with DCM must be changed immediately.

Personal Protective Equipment (PPE)

DCM may only be handled while wearing the following PPE:

Eye Protection

- Safely glasses or goggles

- Face shield

Skin Protection

- Lab coat

- Apron (optional)

Hand Protection (choose one)

- Nitrile gloves (double gloved)

- Polyvinyl alcohol gloves

- LLDPE gloves

- Viton gloves

- Silvershield gloves

References

- [Ansell Chemical Glove Resistance Guide](#)
- [A Guide to Complying with the 2024 Methylene Chloride Regulation](#)
- [EPA Fact Sheet: Methylene Chloride or Dichloromethane](#)
- [FACT SHEET: 2024 Final Risk Management Rule for Methylene Chloride under TSCA](#)
- [Methylene Chloride Hazards for Bathtub Refinishers](#)
- [Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal: Methylene Chloride](#)
- [Risk Evaluation for Methylene Chloride](#) - See Appendix F for details on glove materials

