

**METHYLENE
CHLORIDE
MANAGEMENT
PLAN**

Review and Approval Authority

Prepared by:

Industrial Hygienist

Date

Reviewed and Approved by:

Chair- UM EH&S Operations Committee

Date

Chair - UM EH&S Policy Committee

Date

Approved as University of Maryland Policy:

President

Date

Table of Contents

EMERGENCY AND ASSISTANCE TELEPHONE NUMBERS	iv
POLICY STATEMENT	1
GLOSSARY OF TERMS	3
METHYLENE CHLORIDE ASSESSMENT AND MONITORING	4
TRAINING	5
LABELS AND REGULATED AREAS	6
MEDICAL SURVEILLANCE	7
PERSONAL HYGIENE PRACTICES	8
RESPIRATORY PROTECTION	9
METHYLENE CHLORIDE REQUIREMENTS MATRIX	APPENDIX A



Emergency and Assistance Telephone Numbers

UM Emergency (Fire - Police - Rescue) - 24 hours #	911
CALL IMMEDIATELY FOR <u>ANY</u> EMERGENCY INCLUDING CHEMICAL SPILL, FIRE, PERSONAL SECURITY, INJURED OR SICK PERSON	
Environmental Safety (Main Office)	(301) 405-3960
(Industrial Hygiene, Biological Safety, Occupational Safety, Hazardous Waste Management, Fire Protection, Radiation Safety, Insurance Services, Hazard Communication, Accident Investigation, Air Monitoring and Safety Education)	
University Health Center - Occupational Health	(301) 314-8172
(Medical Consultation and Evaluation)	
Facilities Management Work Control Center	(301) 405-2222
(Repair of Facility Equipment Deficiencies, e.g., steam line leaks, electrical failures, ventilation problems, etc.)	
Maryland Poison Control Center	1-800-492-2414



Policy Statement on Methylene chloride

I. Purpose

This is a statement of official University policy to establish the process for compliance with OSHA 29 CFR 1910.1052, Methylene chloride.

II. Scope

This plan applies to all University employees who are exposed or potentially exposed to methylene chloride, its solutions, and materials that release methylene chloride.

III. Policy

The University is dedicated to providing safe and healthful work facilities for students and employees, and complying with federal and State occupational health and safety standards. Engineering controls should be instituted to the maximum extent feasible to maintain exposures below permissible limits, followed by other control methods including work and hygienic practices, including the use of personal protective equipment such as eye, face, skin, and respiratory protection. Administrators, managers, faculty, staff and students all share responsibility for minimizing their exposure to methylene chloride.

IV. Duties and Responsibilities

1. Department of Environmental Safety (DES) shall:
 - (a) Develop and distribute a written Methylene chloride Management Plan;
 - (b) Provide or coordinate training for employees who are exposed to methylene chloride at or above an 8-hour average exposure of 12.5 parts per million (ppm). Employees who require training will be identified through exposure monitoring;
 - (c) Conduct exposure monitoring and notify employees in writing of monitoring results within 15 days of receipt;
 - (d) Maintain records of all training, exposure monitoring, and respirator fit testing;
 - (e) Provide consultative technical guidance to personnel at all levels of responsibility concerning methylene chloride, hazard evaluation, hazard control and hazard information; and
 - (f) Annually review the Methylene chloride Management Plan for effectiveness and revise as necessary.
2. University Health Center Occupational Health Unit shall:
 - (a) Coordinate and direct all required or recommended medical surveillance for employees with methylene chloride exposure;
 - (b) Provide medical consultations and examinations for workers who have been overexposed or believe they may have been overexposed to methylene chloride; and

- (c) Maintain medical records relating to consultations, examinations and medical surveillance as required by the Plan.
- 3. Department of Architecture, Engineering and Construction shall:
 - (a) Identify to DES construction locations where methylene chloride is used or where building materials contain or may reasonably be expected to off-gas methylene chloride.
- 4. Department Heads and Supervisors shall:
 - (a) Assure that all employees who have potential for exposure to methylene chloride are evaluated by DES and made aware of the hazards associated with methylene chloride; and
 - (b) Insure control measures and personal protective equipment are appropriate for the situation.
 - (c) Communicate to their employees the elements of the Methylene chloride Plan when it is determined by DES through surveys and monitoring that there is occupational exposure;
 - (d) Assure that employees are aware of the potential hazards associated with working with methylene chloride and receive appropriate training;
 - (e) Notify DES when new products or processes are used that might result in methylene chloride exposure and arrange for exposure monitoring through DES where needed to document exposure levels;
 - (f) Initiate medical surveillance for any employee who has methylene chloride exposure in excess of regulated limits as determined by DES, who develops signs and symptoms of overexposure to methylene chloride, or who is exposed to methylene chloride in emergencies;
 - (g) Report any problem associated with implementation of the Methylene chloride Management Plan to DES; and
- 5. Employees shall:
 - (a) Comply with the provisions of the Methylene chloride Management Plan and work practices instituted by the Supervisor; and
 - (b) Report to their supervisor if they develop signs and symptoms of overexposure to methylene chloride, or who are exposed to methylene chloride in the course of an emergency.

V. Information

Assistance will be provided by the Department of Environmental Safety to any Department or individual requesting guidance and assistance for implementation of control measures or training to satisfy implementation of this policy.

Departmental telephone number : (301) 405-3960

E-Mail address : safety@umd.edu.

Web site address : <http://www.essr.umd.edu>.

Glossary of Terms

Action Level (AL): A concentration of methylene chloride of 12.5 parts methylene chloride per million parts of air (12.5 ppm) calculated as an 8- hour time-weighted average (TWA) concentration.

Authorized Person: Any person required by work duties to be present in regulated areas, or authorized to do so by the University of Maryland.

Methylene chloride: The chemical substance, CH₂Cl₂, Chemical Abstracts Service Registry No. 75-09-2. Methylene chloride is used as a solvent, especially where high volatility is required. It is a solvent for oils, fats, waxes, resins, rubber, and cellulose acetate. It is used as a laboratory reagent, in paint removers, in propellant mixtures for aerosol containers, as a solvent for plastics, as a degreasing agent, and as an extracting agent in laboratories and as a blowing agent in polyurethane foams, and in adhesives that require quick curing times. Its solvent property is sometimes increased by mixing with methanol, petroleum naphtha, or tetrachloroethylene.

Initial Monitoring: Identification of all employees who may be exposed at or above the action level or at or above the STEL and accurately determine the methylene chloride exposure of each employee so identified. Initial monitoring shall be repeated each time there is a change in production, equipment, process, personnel, or control measures which may result in new or additional exposures to methylene chloride.

Permissible Exposure Limit (PEL): The allowable exposure that an employee can be exposed to over an 8-hour Time-Weighted Average (TWA). For methylene chloride, the limit is 25 parts per million (ppm).

Periodic Monitoring: The monitoring of employees shown by initial monitoring to be at or above the action level or at or above the STEL. The monitoring program shall follow the table listed under Monitoring Strategy.

PPM: Parts per million.

Short Term Exposure Limit (STEL): A limit of 125 ppm of methylene chloride, averaged over a 15-minute period.

Regulated Areas: Areas where the concentration of airborne methylene chloride exceed the PEL or STEL. All entrances and access ways shall be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed within the regulated area.

Time-weighted average (TWA): The average exposure to methylene chloride an individual receives for a full eight-hour day.

Methylene Chloride Assessment and Monitoring

The following processes or work operations may result in methylene chloride exposure:

- Any process that uses methylene chloride.
- Any processes where there have been employee complaints or symptoms indicative of exposure to methylene chloride.
- Any liquid or spray process involving methylene chloride, including spraying adhesive, paint removal or plastic fabrication and cleaning.
- Disposing or processing methylene chloride waste.

To conduct methylene chloride assessments, DES requires an inventory of locations where methylene chloride is used. This may be accomplished by:

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- Reviewing material safety data sheets (MSDS).
- Reviewing methylene chloride chemical waste inventories.
- Checking historical use data.
- Conducting walkthroughs of laboratories and other facilities where methylene chloride is used.
- Reviewing laboratory signage data.
- Any other type of pertinent data, including University Health Center Occupational Health Unit notifications and employee complaints.

Upon identification, DES will identify operations where methylene chloride is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin.

Exposure Assessment Methods

DES will use appropriate methods to assess methylene chloride levels, which include:

- Use of objective data. (i.e., previously documented information that confirms or rebuts methylene chloride exposures at regulated concentrations).
- Appropriate workplace contaminant sampling methods.

Monitoring Strategy

When there are different processes where employees may be exposed to methylene chloride, DES will select a maximum risk employee. This will be accomplished by observing the worksite.

If measurements show exposure to methylene chloride at or above the action level or the STEL, then all employees identified in the same group will be monitored

TWA's are usually determined for an 8-hour work shift. A personal sampling pump is affixed to the employee and is collected at the end of the shift. The sample is then analyzed for methylene chloride. STEL assessments are 15-min samples taken during periods of maximum expected concentrations. Multiple STEL measurements may be collected per shift, and only the highest

concentration is used to represent the employee's STEL. Employee exposures determine the need for compliance with provisions of the regulation and the Methylene chloride Management Plan.

Exposure scenario	Require monitoring activity
Below the AL and at or below the STEL	No 8-hour TWA or STEL monitoring required
Below the AL and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months
At or above the AL, at or below the TWA, and at or below the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
At or above the AL, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. ¹
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months

1. The employer may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. The employer may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the AL. The employer may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least 7 days apart are at or below the STEL.

Monitoring results determine the need and extent of employee training, hygiene procedures, personal protective equipment, follow-up monitoring, and medical surveillance. The Methylene chloride Requirements Matrix (Appendix A) summarizes institutional and supervisory responsibilities for employees meeting the specified criteria.

Department heads, supervisors, or users may contact DES to initiate exposure monitoring in their worksites.

Training

All employees with any potential exposure to methylene chloride must receive training to provide an understanding of hazards and protection methods. This training is a component of the Chemical Hygiene Program in laboratories, and is addressed by the Hazard Communication Program in all other worksites. Please review these programs if methylene chloride is present in your workplace.

Employees who are assigned to workplaces where exposure to methylene chloride has been documented at or above the AL, they shall be informed of:

- (a) The requirements of 29 CFR 1910.1052, Methylene chloride, and information available in its Appendices;
- (b) The quantity, location, manner of use, release, and storage of methylene chloride;
- (c) The specific operations in the workplace that could result in exposure, noting where

exposures may be greater than the PEL or STEL.

Employees shall receive information and training at the time of initial assignment, and whenever there is a change in procedure that may result in a new exposure. Also, affected employees shall be re-trained as necessary to ensure that each employee exposed above the AL or the STEL maintains competency in the principles of safe use and handling of methylene chloride at the worksite.

Labels and Regulated Areas

Labels

The chemical manufacturer, importer, or distributor shall ensure that each container is labeled according to the University's Hazard Communication Program.

Materials containing methylene chloride shall also list the following health hazards:

- Cancer
- Cardiac effects (including elevation of carboxyhemoglobin)
- Central nervous system effects
- Liver effects
- Skin and eye irritation.

An example of a label that would satisfy this requirement would be:

Danger

Contains Methylene chloride.

Potential Cancer Hazard. May worsen heart disease because methylene chloride is converted to carbon monoxide in the body.

May cause dizziness, headache, irritation of the throat and lungs, loss of consciousness and death at high concentrations (for example, if used in a poorly ventilated room). Avoid skin contact. Contact with liquid causes skin and eye irritation.

It is the responsibility of the user to ensure that containers remain labeled with the identity and appropriate hazard warnings. Temporary containers require only the identity of the material if it is intended for immediate use (within one work shift) by an employee and must be returned to a container with appropriate warnings by the end of the work shift.

Regulated Areas

Areas where the concentration of airborne methylene chloride exceeds either the PEL or STEL shall be established as regulated areas. Regulated areas shall be demarcated from the rest of the workplace in any manner (such as yellow barrier tape or signs) that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed

to methylene chloride within the regulated area.

Access shall be limited to authorized employees. The employer shall supply a respirator to each person who enters a regulated area and it shall be worn whenever methylene chloride exposures are likely to exceed the PEL or STEL.

Medical Surveillance

A medical surveillance program will provide annual examinations for all employees who:

- Are exposed to methylene chloride at or above the action level on 30 days or more per year or above the 8-hour TWA PEL or the STEL on 10 or more days per year;
- Above the 8-hour TWA PEL or STEL for any time period where an employee has been identified by the University Health Center Occupational Health Unit as being at risk from cardiac disease or from some other serious methylene chloride health condition and such employee requests inclusion in the medical surveillance program; and
- During an emergency.

Initial medical surveillance shall be provided on or before the time of initial assignment.

Periodic medical surveillance shall be provided as follows:

- For employees 45 years and older, within 12 months of the initial surveillance.
- For employees younger than 45 years of age, within 36 months of the initial surveillance.
- When an employee terminates employment or is reassigned to an area where exposure to methylene chloride is consistently at or below the AL and STEL, medical surveillance shall be made available if six months or more have elapsed since the last surveillance.
- Additional medical surveillance shall be performed when recommended by Occupational Health Unit.

The following information shall be provided to the University Health Center Occupational Health Unit by the Supervisor:

- A copy of OSHA 29 CFR 1910.1052 (j)(8) including its applicable appendices;
- A description of the affected employee's past, current and anticipated future duties as they relate to the employee's methylene chloride exposure;
- The employee's former or current exposure levels or, for employees not yet occupationally exposed to methylene chloride, the employee's anticipated exposure levels and the frequency and exposure levels anticipated to be associated with emergencies;
- Information concerning any personal protective equipment and respiratory protection used or to be used by the employee; and
- Information from previous medical examinations of the affected employee within the control of the employer.

All medical procedures shall be performed by or under the supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place. The details of the medical examination can be found in OSHA 29 CFR 1910.1052 (j)(5).

For each examination required under medical surveillance, the employer shall obtain a written opinion from the University Health Center Occupational Health Unit. This written opinion shall contain the results of the medical examination except that it shall not reveal specific findings or diagnoses unrelated to occupational exposure to methylene chloride.

The written opinion shall be limited to:

- Whether exposure to methylene chloride may contribute to or aggravate the employee's existing cardiac, hepatic, neurological or dermal disease;
- Whether any employee's health would be at increased risk of material impairment from exposure to methylene chloride;
- Any limitations upon the employee's exposure to methylene chloride, including removal from exposure, the use of respirators, and other protective equipment; and
- A statement that the employee has been informed that methylene chloride is a potential occupational carcinogen, of risk factors for heart disease, and the potential exacerbation of underlying heart disease by exposure to methylene chloride through its metabolism to carbon monoxide.

If the employee is not exposed above the PEL, the Occupational Health Unit must cite specific medical evidence that the employee has suffered exposure before medical removal can be accomplished. If such evidence is not cited, then the employer is not required to remove the employee.

After consulting with the University Health Center Occupational Health Unit regarding the determination of medical removal from exposure to methylene chloride or any restrictions involved, the employee may designate a second physician to review any findings, determinations, or recommendations of the initial physician and have the second physician conduct examinations, consultations, and laboratory tests as necessary to evaluate the effects of methylene chloride exposure and to facilitate the review.

Personal Hygiene Practices

Protective Equipment and Clothing

Where needed to prevent methylene chloride-induced skin or eye protection, employers shall comply with the provisions of OSHA 29 CFR 1910.132 (Personal Protective Equipment), 29 CFR 1910.133 (Eye and Face Protection) and the University of Maryland's Personal Protective Equipment Program.

Personal protective equipment and clothing which is resistant to methylene chloride shall be selected. The employer shall clean, launder, repair and replace all protective clothing and equipment as needed to maintain their effectiveness.

Eye washes and Showers

If there is a chance that employees' skin may contact solutions containing 0.1 percent or greater methylene chloride, then washing facilities capable of removing methylene chloride shall be conveniently located.

If there is a chance that employees' eyes may contact solutions containing 0.1 percent or greater methylene chloride, then eyewash facilities shall be located within the immediate work area for emergency use.

Leak Detection and Preventative Maintenance

For operations involving methylene chloride, the employer shall implement a program to detect leaks and spills, including regular visual inspections.

Preventative maintenance of equipment, including surveys for leaks, shall be undertaken at regular intervals. In work areas where spillage may occur, the employer shall make provisions to contain up the spill, to decontaminate the work area, and to dispose of the waste.

Respiratory Protection

Whenever feasible engineering and work practice controls (for example, local exhaust ventilation) cannot reduce employee exposure below the PEL or STEL, the employer shall continue to apply these controls to reduce employee exposures to the maximum extent feasible and shall supplement them with respirators when required.

Respirators must be used:

- When exposures meet or exceed the PEL,
- During periods necessary to install or implement feasible engineering controls,
- When work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work-practice controls are not feasible,
- In work operations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure below the PEL, or
- During emergencies.

The use of respiratory protection shall be in accordance with the University of Maryland's Respiratory Protection Program. All workers must be medically evaluated by the Occupational Health Unit of the University Health Center to determine the ability of the worker to perform the work while wearing a respirator. Training in the care and use respirators and fit-testing will be conducted by DES for only those employees who are authorized by Occupational Health to wear a respirator. Any worker who is not authorized by the Occupational Health Unit will be prohibited from engaging in activities which may expose the worker to airborne methylene chloride at or above the PEL.

Appropriate respirators must be selected based upon employee exposure levels.

The following types of respirators are appropriate for the indicated exposures:

Methylene chloride exposure (ppm)	Minimum respirator required ¹
Up to 625 ppm (24 X PEL)	Continuous flow supplied air respirator, hood or helmet.
Up to 1250 ppm (50 X 8-TWA PEL)	(1) Full facepiece supplied-air respirator operated in negative (demand) mode, or (2) Full facepiece self-contained breathing apparatus (SCBA) operated in negative pressure (demand) mode.
Unknown concentration, or above 5000 ppm (Greater than 200 X 8-hour TWA PEL)	(1) Continuous flow supplied-air respirator, full facepiece , or (2) Pressure demand supplied-air respirator, full facepiece , or (3) Positive pressure full facepiece SCBA.
Firefighting	Positive pressure full facepiece SCBA.
Emergency escape	(1) Any continuous flow or pressure demand SCBA, or (2) Gas mask with organic vapor canister.

1. Respirators specified for use at higher concentrations may be used at lower concentrations.

Appendix A- Methylene Chloride Requirements Matrix

	12.5 ppm AL	25 ppm PEL ²	125 ppm STEL	≤ 625 ppm	Unknown conc.	0.1% or greater conc.	Symptoms of Exposure	Eye hazard	At any conc.
Hazard Communication Training^{8,15}	x	x	x	x		x			
Site-specific Training^{12,13}	x	x	x	x	x				
Respirator³		x	x	x ^a	x ^b				
Med. Surv.^{10,11}	x	x	x				x		x
Signs⁹		x	x						
Regulated Area⁹		x	x						
Waste Disposal¹	x	x	x						x
Record keeping	x	x	x						x
Work Practices		x	x						
Hygiene Practices		x	x						
Engineering Controls		x	x						
Protective Clothing¹⁴									x
Contaminated PPE laundering¹⁴									x
Eye/ Face Protection¹⁴									x
Emergency Eyewash						x		x	
Emergency Shower						x			
Labels⁵									x
MSDS¹⁵									x
Initial monitoring⁶									x
Periodic monitoring⁷	x	x	x						
Preventative Maintenance and leak surveys									x
Housekeeping and leak detection inspections									x
Spill containment, decontamination									x
Medical Removal⁴	x								x
Written Hazcom Program⁸						x ^c			

1. Contact Environmental Affairs at (40)53990 for more information.

2. Or exceeds the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 50 ppm.
3. Includes medical surveillance, training, and fit testing.
4. If the employee is not exposed above the PEL, the physician shall cite specific medical evidence rebutting the exposure. If clear medical evidence shows effects, the employee must be removed from exposure. If evidence is not sufficient, the employee does not have to be removed. When the physician's evidence shows methylene chloride exposure at any level may aggravate the employees existing cardiac, hepatic, neurological, or skin disease, the employee shall be removed.
5. Labels shall comply with Hazcom, 29 CFR 1910.1200(f). Also, the labels shall contain hazards such as cancer, cardiac effects (including elevation of carboxyhemoglobin), central nervous system effects, liver effects, and skin and eye irritation. An example of a label that would meet the requirements would be "**Danger. Contains Methylene chloride. Potential Cancer Hazard. May worsen heart disease because methylene chloride is converted to carbon monoxide in the body. May cause dizziness, headache, irritation of the throat and lungs, loss of consciousness and death at high concentrations (for example, if used in a poorly ventilated room). Avoid skin contact. Contact with liquid causes skin and eye irritation**". For laboratories falling under 29 CFR 1910.1450, see the University's Chemical Hygiene Plan.
6. Unless it can be shown by objective data that there will be no exposure at or above the action level or STEL under foreseeable conditions of use.
7. Repeat every 6 months if at or above the action level. If above STEL, repeat every year. Monitoring may be discontinued if results from 2 consecutive samples taken at least 7 days apart are below the action level and the STEL.
8. For work sites falling under Hazcom, refer to 1910.1200(g)(2)(i)(C)(1) for applicability. For laboratories falling under 29 CFR 1910.1450, refer to the University's Chemical Hygiene Plan.
9. Demarcate from the rest of the workplace in any manner that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed within the regulated area.
10. At or above the action level on 30 or more days per year, or above the PEL or STEL on 10 or more days per year, or above the PEL or STEL for any time period where an employee has been identified by a licensed physician as being at risk from cardiac disease or from some other serious methylene chloride-related health condition and such employee requests inclusion in the medical surveillance program.
11. Provide annually from initial for employees >45 years old, if < 45 years old, provide every 36 months from initial. When employee terminates, or is no longer exposures at or below the action level and STEL, provide if six months have elapsed since last surveillance. Additional surveillance shall be provided if in written medical opinion.
12. If exposure could be above the action level, the University shall inform each affected employee of the quantity, location, manner of use, release, and storage of methylene chloride and the specific operations in the workplace that could result in exposure, noting where exposures may be > than the PEL or STEL.
13. Re-training shall be provided as necessary to ensure each employee exposed above the action level or the STEL maintains the requisite understanding of the principles of safe use and handling of methylene chloride in the workplace.
14. Where needed to prevent methylene chloride-induced skin or eye irritation.
15. See 1910.1200(g)(2)(i)(C)(1) for applicability.
 - a. Continuous flow supplied-air respirator, hood or helmet.
 - b. Positive pressure full face piece SCBA or full face piece pressure demand supplied-air respirator with an auxiliary self-contained air supply.
 - c. For materials that have been determined to be health hazards, where the concentration is $\geq 0.1\%$ methylene chloride, and there is evidence that methylene chloride could be released in concentrations which would exceed the PEL or the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), or could present a health risk to employees.