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| <b>UT Health Science Center:</b>                            |                                     |
| <b>HM5210 - Methylene Chloride Handling in Laboratories</b> |                                     |
| <b>Version 1</b>  | <b>Publication Date: 12/12/2025</b> |

## Objective

This procedure describes the requirements for handling methylene chloride in accordance with the U.S. EPA Toxic Substances Control Act (TSCA) and the Tennessee Occupational Safety and Health Administration regulatory requirements.

## Scope

This procedure is applicable to all University of Tennessee Health Science Center campuses and covers potentially exposed persons (employees, students and visitors) in laboratories handling methylene chloride.

## Roles and Responsibilities

Executive leadership must:

- Allocate organizational resources to ensure compliance with this procedure.
- Ensure compliance with this procedure.

Department Chairs must:

- Allocate departmental resources to ensure compliance with this procedure.
- Ensure compliance with this procedure by personnel under their oversight.

Principal Investigator or work area supervisor must:

- Maintain an accurate inventory of hazardous chemicals work areas under their oversight.
- Ensure individuals in areas under their oversight comply with institutional procedures including the Chemical Hygiene Plan and the Methylene Chloride Exposure Control Plan.
- Prepare SOP(s) for the handling of methylene chloride.
- Provide or ensure personnel under their oversight complete safety training, including an annual review of the Methylene Chloride Exposure Control Plan.
- Maintain safety training documentation.
- Inform Chemical Hygiene Officer of changes to the handling of methylene chloride with the potential affect the exposure concentration of potentially exposed persons.

The Director of Research Safety Affairs, henceforth referred to as the Chemical Hygiene Officer, must:

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- Maintain and implement the chemical hygiene plan.
- Update the Methylene Chloride Exposure Control Plan.
- Annually evaluate the performance of the chemical hygiene plan and the appendix: Methylene Chloride Exposure Control Plan.
- Coordinate personal exposure monitoring to characterize the exposure of potentially exposed persons.
- Assign personnel to similar exposure groups.
- Maintain records to support the industrial hygiene program (e.g., exposure assessment records, respiratory protection records).
- Perform annual evaluation of chemical fume hood performance.

Any potentially exposed person (i.e., employees, students, or visitors) must:

- Comply with institutional policies, plans and procedures.
- Complete safety training.
- Report unsafe conditions to their supervisor or the chemical hygiene officer.

## Definitions

- AL - Action Level: The concentration of a substance triggering safety actions such as medical surveillance or exposure monitoring.
- CHP - Chemical Hygiene Plan: A safety protocol outlining procedures to protect employees from chemical hazards in the workplace.
- DCM - Dichloromethane: A volatile solvent widely used in laboratories, also known as methylene chloride.
- ECEL - Existing Chemical Exposure Limit: The EPA 8-hour time-weighted average limit of exposure below which potentially exposed persons are believed to be protected from unreasonable risk associated with the handling of this material. .
- EPA - Environmental Protection Agency: The U.S. federal agency responsible for regulating chemicals and protecting environmental and public health.
- IDLH - Immediately Dangerous to Life or Health: Exposure levels that pose immediate threats to life or health, requiring immediate action.
- NIOSH - National Institute for Occupational Safety and Health: U.S. federal agency responsible for research and recommendations on workplace health and safety.
- OSHA - Occupational Safety and Health Administration: U.S. agency that regulates workplace safety and health standards.

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- PPE - Personal Protective Equipment: Equipment worn to minimize exposure to hazards, such as gloves, goggles, and respirators.
- SEG - Similar Exposure Group: A group of workers exposed to the same level of a hazardous substance due to similar work processes.
- STEL - Short-Term Exposure Limit: The maximum exposure limit for a hazardous substance over a 15-minute period.
- TSCA - Toxic Substances Control Act: U.S. law regulating the use and handling of chemicals to protect health and the environment.
- TWA - Time-Weighted Average: The average exposure to a chemical over an 8-hour workday or 40-hour workweek.
- WCPP - Workplace Chemical Protection Program: A safety program ensuring compliance with chemical handling regulations in the workplace.

## Procedure

### I. Methylene Chloride Handling

#### A. Authorization

Methylene chloride handling is prohibited except for use as a laboratory chemical. Individuals seeking to handle methylene chloride as a laboratory chemical must be authorized by their Principal Investigator or supervisor and do so in accordance with the handling requirements described in the Chemical Hygiene Plan and Methylene Chloride Exposure Control Plan. The Principal Investigator or supervisor is required to evaluate the use of alternative compounds before authorizing the handling of methylene chloride. Significant changes to the volume of methylene chloride being handled, exposure controls or equipment being utilized require authorization from the Chemical Hygiene Officer.

#### B. Handling Procedures

Individuals handling methylene chloride must comply with the requirements of the chemical hygiene plan, standard operating procedure(s) (SOP), and exposure control plan. This includes the use of prescribed engineering controls, work practices and PPE.

#### C. Hygiene Facilities

Areas where methylene chloride is handled will be equipped with a handwashing sink stocked with soap and paper towels. Work areas where a quantity of methylene chloride is handled that may constitute a splash risk that may soak through a lab coat resulting in

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dermal contact will also be equipped with an emergency shower. Emergency eyewash and shower facilities will be maintained in accordance with the institutional procedure for emergency eyewash stations.

#### D. Regulated Areas

Regulated areas will be demarcated to identify the presence of a regulated area. Eating, drinking, and the application of cosmetics is prohibited in regulated areas. Access to regulated areas will be restricted only to individuals that have been trained and authorized to enter. Individuals within a regulated area when there is the potential to be exposed to a methylene chloride concentration that exceeds the ECEL or EPA STEL will wear a supplied air respirator. Individuals authorized to enter regulated areas will participate in a medical surveillance program by completing the methylene chloride medical surveillance questionnaire at least annually and submitting it for review to the health care provided identified by the institution.

#### II. Personnel Exposure

Methylene chloride exposure will be maintained below the ECEL of 2 ppm and the EPA STEL of 16 ppm. If exposures cannot be maintained below this level through the use of engineering controls, such as local exhaust ventilation, individuals will be provided and required to wear respirators in accordance with the institutional Respiratory Protection Program.

The exposure of each potentially person potentially exposed to methylene chloride will be characterized. Exposures will be characterized based on personal monitoring samples results collected from individuals believed to represent the worst-case exposure scenario for each similar exposure group. Additional exposure assessment will be performed when individuals engage in new methylene chloride handling activities or at the interval described in Table 1 below.

Table 1: Periodic Monitoring Frequency

| Initial Monitoring Concentration  | Periodic Monitoring Requirement |
|-----------------------------------|---------------------------------|
| <ECEL action level & STEL         | At least every 5 years          |
| ≥ ECEL action level & ≤ ECEL/STEL | Every 6 months                  |

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| >ECEL /STEL | Every 3 months |
|-------------|----------------|

### III. Exposure Control Plan

An exposure control plan that communicates the details of the program to control methylene chloride to a level below the ECEL and EPA STEL can be found as an appendix in the CHP. This exposure control plan will be reviewed and updated at least every five years. The exposure control plan is available to potentially exposed persons and addresses the following requirements:

- Exposure controls to be used as well as those that are not permissible for use.
- Rationale for the exposure controls that have been selected as well as those that have not been selected.
- Actions necessary to implement the exposure controls.
- Management of regulated areas.
- Procedures for responding to changes.

### IV. Training

Individuals handling methylene chloride or granted access to regulated areas will complete methylene chloride hazard communication training. The training content will address the requirements detailed in the Methylene Chloride Exposure Control Plan. Individual required to wear a respirator will also comply with the training requirements identified in the institutional Respiratory Protection Program.

### V. Medical Surveillance

Medical surveillance will be available for employees who may be exposed above the action level on 30 or more days per year or above the ECEL or EPA STEL on 10 or more days per year. Medical surveillance will include completion of the Questionnaire for Methylene Chloride Exposure provided in Attachment 1 of this procedure. Medical surveillance will be provided at no cost to personnel, without loss of pay, and at a reasonable time and place. Medical surveillance procedures will be performed by a physician or other licensed health care professional. Initial and periodic medical surveillance will also be provided in accordance with the requirements of 29 CFR 1910.1052. When a medical determination recommends removal because the employee's exposure to MC may contribute to or aggravate the employee's existing

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cardiac, hepatic, neurological including stroke), or skin disease, the employer must provide medical removal protection benefits as detailed in 29 CFR 1910.1052.

#### VI. Recordkeeping

Records related to this procedure will be maintained as follows.

- Exposure records will be maintained for at least 30 years and will be maintained by the Chemical Hygiene Officer.
- Medical surveillance records will be maintained for the duration of employment plus 30 years and will be maintained by the licensed healthcare provider engaged by the institution.
- Training records will be maintained for a minimum of three years from the date of training and will be maintained by the employee, the employee's supervisor, and the Office of Research Safety Affairs.

#### **Penalties/Disciplinary Action for Non-Compliance**

Non-compliance with any part of this procedure may result in disciplinary action of employees or students and/or civil or criminal penalties.

#### **Related Policies/Guidance Documents**

[29 CFR 1910.1052](#)

[Methylene Chloride; Regulation Under the Toxic Substances Control Act](#)

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ATTACHMENT 1:  
QUESTIONNAIRE FOR METHYLENE CHLORIDE EXPOSURE  
(Taken from 29 CFR 1910.1052 Appendix B)

*Demographic Information*

1. Name
2. Date
3. Date of Birth
4. Age
5. Present occupation
6. Sex
7. Race (Check all that apply)
  - a. White \_\_\_\_\_
  - b. Hispanic or Latino \_\_\_\_\_
  - c. Asian \_\_\_\_\_
  - d. Black or African American \_\_\_\_\_
  - e. American Indian or Alaska Native \_\_\_\_\_
  - f. Native Hawaiian or Other Pacific Islander \_\_\_\_\_

*Occupational History*

1. Have you ever worked with methylene chloride, dichloromethane, methylene dichloride, or CH<sub>2</sub>Cl<sub>2</sub> (all are different names for the same chemical)?
2. Have worked in any of the following industries?
  - Furniture stripping
  - Polyurethane foam manufacturing
  - Chemical manufacturing or formulation
  - Pharmaceutical manufacturing
  - Any industry in which you used solvents to clean and degrease equipment or parts
  - Construction, especially painting and refinishing

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Aerosol manufacturing  
Any industry in which you used aerosol adhesives

### III. Medical History

#### A. General

1. Do you consider yourself to be in good health? If no, state reason(s).
2. Do you or have you ever had:
  - a. Persistent thirst
  - b. Frequent urination (three times or more at night)
  - c. Dermatitis or irritated skin
  - d. Non-healing wounds
3. What prescription or non-prescription medications do you take, and for what reasons?
4. Are you allergic to any medications, and what type of reaction do you have?

#### B. Respiratory

1. Do you have, or have you ever had any chest illnesses or diseases? Explain.
2. Do you have or have you ever had any of the following:
  - a. Asthma
  - b. Wheezing
  - c. Shortness of breath
3. Have you ever had an abnormal chest X-ray? If so, when, where, and what were the findings?
4. Have you ever had difficulty using a respirator or breathing apparatus? Explain.
5. Do any chest or lung diseases run in your family? Explain.
6. Have you ever smoked cigarettes, cigars, or a pipe? Age started:
7. Do you now smoke?
8. If you have stopped smoking completely, how old were you when you stopped?
9. On the average of the entire time you smoked, how many packs of cigarettes, cigars, or bowls of tobacco did you smoke per day?

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C. Cardiovascular

1. Have you ever been diagnosed with any of the following: Which of the following apply to you now or did apply to you at some time in the past, even if the problem is controlled by medication? Please explain any yes answers (i.e., when problem was diagnosed, length of time on medication).
  - a. High cholesterol or triglyceride level
  - b. Hypertension (high blood pressure)
  - c. Diabetes
  - d. Family history of heart attack, stroke, or blocked arteries
2. Have you ever had chest pain? If so, answer the next five questions.
  - a. What was the quality of the pain (i.e., crushing, stabbing, squeezing)?
  - b. Did the pain go anywhere (i.e., into jaw, left arm)?
  - c. What brought the pain out?
  - d. How long did it last?
  - e. What made the pain go away?
3. Have you ever had heart disease, a heart attack, stroke, aneurysm, or blocked arteries anywhere in your body? Explain (when, treatment).
4. Have you ever had bypass surgery for blocked arteries in your heart or anywhere else? Explain.
5. Have you ever had any other procedures done to open a blocked artery (balloon angioplasty, carotid endarterectomy, clot-dissolving drug)?
6. Do you have or have you ever had (explain each):
  - a. Heart murmur
  - b. Irregular heartbeat
  - c. Shortness of breath while lying flat
  - d. Congestive heart failure
  - e. Ankle swelling
  - f. Recurrent pain anywhere below the waist while walking

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7. Have you ever had an electrocardiogram (EKG)? When?
8. Have you ever had an abnormal EKG? If so, when, where, and what were the findings?
9. Do any heart diseases, high blood pressure, diabetes, high cholesterol, or high triglycerides run in your family? Explain.

D. Hepatobiliary and Pancreas

1. Do you now or have you ever drunk alcoholic beverages?

Age started: \_\_\_\_ Age stopped: \_\_\_\_.

2. Average numbers per week:

- a. Beers: \_\_\_\_, ounces in usual container:
- b. Glasses of wine: \_\_\_\_, ounces per glass:
- c. Drinks: \_\_\_\_, ounces in usual container:

3. Do you have or have you ever had (explain each):

- a. Hepatitis (infectious, autoimmune, drug-induced, or chemical)
- b. Jaundice
- c. Elevated liver enzymes or elevated bilirubin
- d. Liver disease or cancer

E. Central Nervous System

1. Do you or have you ever had (explain each):

- a. Headache
- b. Dizziness
- c. Fainting
- d. Loss of consciousness
- e. Garbled speech
- f. Lack of balance
- g. Mental/psychiatric illness
- h. Forgetfulness

F. Hematologic

1. Do you have, or have you ever had (explain each):

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- a. Anemia
- b. Sickle cell disease or trait
- c. Glucose-6-phosphate dehydrogenase deficiency
- d. Bleeding tendency disorder

2. If not already mentioned previously, have you ever had a reaction to sulfa drugs or to drugs used to prevent or treat malaria? What was the drug? Describe the reaction.