Occupational Exposure to Methylene Chloride

29 CFR 1910.1052
29 CFR 1915.1052
29 CFR 1926.1152
Chemical Description

- Chlorinated aliphatic hydrocarbon, chemical formula - $\text{CH}_2\text{CL}_2$
- Fat soluble
- Non-flammable
- Volatile compound
- Metabolized to formaldehyde and carbon monoxide
Uses of Methylene Chloride

- Blowing agent in foam manufacturing
- Solvent in aerosol products
- Solvent in manufacturing
- Cleaning and degreasing solvent
- Component of paint strippers
Health Effects

- Causes headaches, decreased attention span, disorientation and loss of consciousness after high exposures
- Metabolizes to carbon monoxide which increases the risk of heart attack
- Causes irritation to eyes and skin and skin burns after prolonged exposure
- Laboratory studies indicate chronic exposure causes cancer
Benefits of Standard

• Revised standard will:
  » Will prevent an estimated 31 cancer deaths per year
  » Will prevent cardiovascular death and material impairment of the central nervous system
Impact on Small Businesses

The standard is:

- Written in plain language
- More performance oriented and flexible
- Designed to reduce paperwork and costs
History of Rulemaking

- **1971** - OSHA adopted ANSI 8-hour TWA 500 ppm, ceiling concentration of 1000 ppm and max peak above ceiling of 2000 ppm (5 minutes in any 2 hours)
- **1975** - ACGIH lowered TLV from 500 ppm to 100 ppm
- **1976** - NIOSH recommended 8-hour TWA of 75 ppm
History of Rulemaking (cont’d)

- 1985 - National Toxicology Program (NTP) reported results of bioassay showing clear evidence of MC carcinogenicity in mice and rats
- 1985 - UAW and others petitioned OSHA to issue Emergency Temporary Standard (ETS), develop guidelines for handling MC, and to initiate 6(b) rulemaking for MC
History of Rulemaking (cont’d)

• 1986 - OSHA issued “Guidelines for Controlling Exposure to Methylene Chloride” and denied petition for ETS
• 1986 - NIOSH published Current Intelligence Bulletin which classified MC as potential occupational carcinogen and recommended control of exposures to the lowest feasible level
History of Rulemaking (cont’d)

• 1986 - OSHA published Advance Notice of Proposed Rulemaking for MC
• 1988 - ACGIH lowered TLV to 50 ppm
• 1991 - OSHA published Notice of Proposed Rulemaking for MC
• 1992 - OSHA held informal public hearings and received public comments on the Proposed MC Rule
History of Rulemaking (cont’d)

- 1994 - OSHA reopened record for feasibility information
- 1994 - Submitted draft final to OMB
- 1995 - Withdrew draft final from OMB pending further analyses
- 1996 - Submitted draft final to OMB and received clearance to publish
- 1997 - Publication of final MC Rule 1/10/97
(a) Scope and Application

Applies to all occupational exposure to methylene chloride in general industry, construction, and shipyard employment.
(b) Definitions

“Emergency” means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which results, or is likely to result in uncontrolled release of MC.

“Symptom” means central nervous system effects such as headaches, disorientation, dizziness, fatigue, and decreased attention span; skin effects such as chapping, erythema, cracked skin or burns; and cardiac effects such as chest pains or shortness of breath.
(c) Permissible Exposure Limits (PELs)

- 8-Hour TWA: 25 ppm
- Short-Term Exposure Limit STEL (15 minutes): 125 ppm
- Action Level (AL): 12.5 ppm
(d) Exposure Monitoring

- **Representative; breathing zone samples**
- **Initial monitoring unless:**
  - objective data exists
  - equivalent monitoring within one year
  - employees exposed less than 30 days per year
    (direct readings can be substituted)
- **Periodic monitoring**
  - where initial results are above the AL or STEL
(d) Exposure Monitoring (cont’d)

<table>
<thead>
<tr>
<th>Exposure Scenario</th>
<th>Required Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Below the AL and at or below the STEL</td>
<td>• No 8-hour TWA or STEL monitoring required</td>
</tr>
<tr>
<td>• Below the AL and above the STEL</td>
<td>• No 8-hour TWA monitoring required; monitor STEL every 3 months</td>
</tr>
<tr>
<td>• At or above the AL, at or below the TWA, and at or below the STEL</td>
<td>• Monitor 8-hour TWA exposures every 6 months</td>
</tr>
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### (d) Exposure Monitoring (cont’d)

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<td>• Monitor 8-hour TWA exposures every 6 months and monitor STEL exposures every 3 months</td>
</tr>
<tr>
<td>• Above the TWA and at or below the STEL</td>
<td>• Monitor 8-hour TWA exposures every 3 months</td>
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(d) Exposure Monitoring (cont’d)

Other Requirements:

• Additional Monitoring
• Employee Notification of Monitoring Results
• Observation of Monitoring
(e) Regulated Areas

- Whenever exposures exceed or can reasonably be expected to exceed either 8-hour TWA PEL or STEL
- Access limited to authorized persons
- Respirators must be supplied to persons entering area
- Demarcation of area
- Communication with other employers
(f) Methods of Compliance

- Engineering and work practices controls
- Respirators as supplemental protection
- Employee rotation as a method of compliance prohibited
- Leak and spill detection procedures required
Respiratory Protection

Respirators required:

- When exposures exceed TWA or STEL;
- During installation of engineering and work practice controls;
- When engineering and work practice control are infeasible such as some maintenance and repair activities;
- When engineering and work practice control are inadequate to achieve PELs; and
- In emergencies
(g) Respiratory Protection (cont’d)

- Examination of employees by physician or other licensed health care provider before use of negative pressure respirators
- NIOSH approved respirators (42 CFR Part 84) with selection and replacement intervals as specified in Table 2 required
- Replacement of gas masks with organic vapor canisters required after emergency use
- Respirator program required in accordance with 29 CFR 1910.134
- Qualitative or quantitative fit testing required
(h) Protective Work Clothing and Equipment

- Must be worn to prevent skin or eye irritation
- Must be cleaned, laundered, repaired, replaced, disposed of, and provided at no cost to employee
- Eye and face protection must meet requirements of 29 CFR 1910.133 or 1915.153
(i) Hygiene Facilities

- Washing facilities provided when employees have potential skin contact with 0.1% or more MC solutions
- Eyewash facilities provided for emergency use when employees have potential eye contact with 0.1% or more MC solutions
(j) Medical Surveillance

- Must be available to affected employees who are:
  - Exposed to MC above the AL for 30 or more days per year, or above the 8-hour TWA PEL or STEL for 10 days or more per year
  - Exposed to MC above the 8-hour TWA PEL or STEL and identified as having a cardiac risk or some other serious MC-related health condition and employee requests inclusion in program
  - Exposed in an emergency
(j) Medical Surveillance (cont’d)

- Must be made available:
  - Within 180 days of the standard’s effective date or initial work assignment whichever is more recent, unless exam was performed within the past 12 months
  - Within one year of any initial or subsequent medical exam with frequency of physical exam varying by age of employee
  - At the end of employment or reassignment to an area where MC exposure is below the AL and STEL
  - When recommended in physician or other licensed health care provider’s written opinion
(j) Medical Surveillance (cont’d)

- Includes the following:
  - A comprehensive medical and work history
  - A physical exam with special emphasis on lungs, cardiovascular system, liver, nervous system and skin, including blood pressure and pulse
  - Laboratory surveillance
  - Any additional information the physician or licensed health care professional determines necessary to provide an appropriate assessment
(j) Medical Surveillance (cont’d)

- Emergency medical exams must include:
  - The appropriate medical treatment and decontamination of the exposed employee
  - A comprehensive physical exam with special emphasis on nervous system, cardiovascular system, lungs, liver, and skin
  - An updated medical history as appropriate for the employee’s medical condition
  - Laboratory surveillance as indicated by the employee’s health status
(j) Medical Surveillance (cont’d)

- The physician or health care professional must be provided with:
  - A copy of the standard and its appendices
  - A description of affected employee’s past, current, and anticipated duties relating to MC exposure
  - The employee’s former or current MC exposure levels or anticipated levels, and frequency
  - A description of any personal protective equipment to be used
  - Information from previous employment-related medical surveillance
(j) Medical Surveillance (cont’d)

- Written medical opinion must include:
  - The licensed health care professional’s opinion about the employee’s medical conditions that increase the risk of material impairment
  - Any recommended limitations on employee exposure to MC and on the use personal protective clothing or equipment and respirators
  - Statements that the physician or licensed health care professional have informed the employee of the carcinogenicity of MC and risk factors for heart disease that may be exacerbated by exposure to MC and the medical exam results requiring further explanation or treatment
(k) Hazard Communication

- The following hazards associated with MC must be communicated on labels and MSDSs in accordance with 29 CFR 1910.1200, 29 CFR 1915.1200, and 29 CFR 1926.59:
  - Cancer
  - Cardiac effects
  - Central nervous system effects
  - Liver effects
  - Skin and eye irritation
Employee Information and Training

- Provided to employees prior to or on initial job assignment and should include the following:
  - Information required under the Hazard Communication Standard
  - Requirements in the standard and appendices
  - Quantity, location, manner of use, release, and storage of MC and the specific nature of operations that result in MC exposure
1) Employee Information and Training (cont’d)

- Information and training must be updated:
  - To ensure employees exposed at or above the AL or STEL maintain understanding of the principles of safe use and handling of MC in the workplace
  - When workplace procedures change or are added that increase employee exposure to above AL
Employers at multiemployer worksites must notify other employers onsite of the use of MC and the associated hazards of MC-containing products in addition to the control measures implemented.
(m) Recordkeeping

- Objective data for exemption from initial monitoring - maintain for duration of reliance on data
- Exposure measurements - maintain for 30 years
- Medical Surveillance - maintain for duration of employment plus 30 years
(n) Dates

- **Effective Date**: April 10, 1997
- **Start-up Dates**:
  - Initial Monitoring - February 4, 1998 for employers with 20 employees; for polyurethane foam manufacturers with 20 to 99 employees, November 6, 1997; for all other employers August 8, 1997.
(n) Dates (cont’d)

• **Start-up Dates (cont’d):**
  
  » **Engineering Controls** - within 3 years after effective date for employers with less than 20 employees; within 2 years for polyurethane foam manufacturers with 20 to 99 employees; and within 1 year for all other employers.

  » **All other requirements of the standard** - within 1 year of the effective date for employers with 20 or less employees; within 270 days for polyurethane manufacturers with 20 to 99 employees; and within 180 days for all employers.
(o) Appendices

- Appendix A - Substance Safety Data Sheet and Technical Guidelines for MC
- Appendix B - Medical Surveillance for MC
- Appendix C - Questions and Answers
- Methylene Chloride Control in Furniture Stripping