

# Lead legislation – state plans

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# Overview – state plans and federal OSHA

**Federal OSHA:** 1910.1025 and 1926.62 (current standards)

**Michigan:** changed numbers for removal and return, and removed ZPP requirement (adopted in 2018, updated 2021)

**California:** lowered AL and PEL, changed numbers for removal and return, added additional trigger points to hygiene, PPE and medical surveillance requirements (adopted, effective January 2025)

**Washington:** established multiple action levels and permissible exposure limits, developed four sets of rules dependent on employee exposure, and developed industry specific guidelines (proposed, last updated 2019)

# Exposure limits (general industry (GI))

## Michigan

- AL – 30  $\mu\text{g}/\text{m}^3$  8-hr TWA
- PEL – 50  $\mu\text{g}/\text{m}^3$  8-hr TWA
- May reduce PEL for extended shifts:
  - PEL, in  $\mu\text{g}/\text{m}^3 = (400)/(\text{hours worked in the day})$

## California

- AL – 2  $\mu\text{g}/\text{m}^3$  8-hr TWA
- PEL – 10  $\mu\text{g}/\text{m}^3$  8-hr TWA
- Separate engineering control air limit (SECAL), lead acid battery manufacturing/recycling – 50  $\mu\text{g}/\text{m}^3$  8-hr TWA initial, 40/30  $\mu\text{g}/\text{m}^3$  8-hr TWA in five years

## Washington

- Action levels:
  - Airborne lead exposure – 10  $\mu\text{g}/\text{m}^3$
  - Surface contamination – 1000  $\mu\text{g}/\text{dm}^2$
  - Handling of metals with 20% lead content
  - Disturbing materials with 0.5% lead content
  - Burning/grinding/blasting materials with 0.1% lead content
- PEL – 20  $\mu\text{g}/\text{m}^3$  8-hr TWA
- Secondary permissible exposure limit (SPEL) – 50  $\mu\text{g}/\text{m}^3$  8-hr TWA

# Exposure limits (construction (C))

## Michigan

- AL – 30  $\mu\text{g}/\text{m}^3$  8-hr TWA
- PEL – 50  $\mu\text{g}/\text{m}^3$  8-hr TWA
- May reduce PEL for extended shifts:
  - PEL, in  $\mu\text{g}/\text{m}^3 = (400)/(\text{hours worked in the day})$

## California

- AL – 2  $\mu\text{g}/\text{m}^3$  8-hr TWA
- PEL – 10  $\mu\text{g}/\text{m}^3$  8-hr TWA
- Exception: Until 2030, no employee conducting abrasive blasting shall be exposed to airborne lead greater than 25  $\mu\text{g}/\text{m}^3$  8-hr TWA

## Washington

- Action levels:
  - Airborne lead exposure – 10  $\mu\text{g}/\text{m}^3$
  - Surface contamination – 1000  $\mu\text{g}/\text{dm}^2$
  - Handling of metals with 20% lead content
  - Disturbing materials with 0.5% lead content
  - Burning/grinding/blasting materials with 0.1% lead content
- PEL – 20  $\mu\text{g}/\text{m}^3$  8-hr TWA
- SPEL – 50  $\mu\text{g}/\text{m}^3$  8-hr TWA

# Other trigger levels, in addition to AL/PEL (GI)

## Michigan

- N/A

## California

- Presumed significant lead work (PSLW):
  - 1. Altering or disturbing materials that contains lead >0.5% concentration by weight, or is reasonably anticipated to contain lead >0.5% concentration by weight (e.g. scrap lead, lead solder, lead bullet fragments and dust, etc.)
  - 2. Torch cutting any scrap metal
  - Exception: not PSLW if work is done less than eight hours during any 30-day period

## Washington

- Basic rules, work generally covered under the scope of the rule:
  - Worker exposure to airborne lead  $\geq 1.5 \mu\text{g}/\text{m}^3$
  - Work with molten metals >0.0001% lead
  - Hot work, burning or otherwise aerosolizing materials with 0.005% lead
  - Work that pulverizes materials with 0.06% lead
  - Work that manipulates materials at ambient temperatures with  $\geq 0.5\%$  lead
  - Work with paints or coatings with  $>1 \mu\text{g}/\text{cm}^2$  of lead
  - Work that leaves free lead on surfaces at  $\geq 4.3 \mu\text{g}/\text{dm}^2$
- Basic rules, work potentially covered under the scope of the rule:
  - Work with lead coatings, suspect coatings (facility construction prior to 1978, corrosion protection coatings, etc.), lead containing productions (lead shot, fishing sinkers, solder, slag, precious metals, etc.) and other materials that may contain lead

# Other trigger levels, interim protection, safe harbor (GI)

## Michigan

- N/A

## California (“interim protection”)

- Prior to performing an exposure assessment, employers shall provide employees performing PSLW with interim protection:
  - Appropriate respiratory protection
  - Appropriate protective work clothing and equipment
  - Medical surveillance
  - Training
  - Posted signs

## Washington (“safe harbor”)

- Industry-specific protocols with limited scope that provide alternate compliance guidelines for employers in those industries
- Contains provisions for:
  - Handling lead containing articles in retail setting
  - Managing lead paint in office and residential settings
  - Incidental lead paint in construction, renovation, repair and painting (RRP) work
  - Gun range work
  - Clean areas (workplaces with lead exposure, but referring to the workers in clean areas not assigned lead-related tasks)
  - Well managed blood lead levels (more flexibility offered to employers that demonstrate they have an effective program in place for managing employee BLLs)
  - Maintenance and repair work

# Other trigger levels, in addition to AL/PEL (C)

## Michigan

- No changes to 1926.62(d)(2), protection of employees during assessment of exposure
- Presumed exposure above the PEL, but not in excess of  $500 \mu\text{g}/\text{m}^3$ : spray painting with lead paint; where lead containing coatings or paints are present – manual demolition of structures, manual scraping, manual sanding, heat gun applications and power tool cleaning with dust collection systems

## California

- Level 1 trigger tasks: presumed exposure above the PEL, but not in excess of  $100 \mu\text{g}/\text{m}^3$ 
  - Where lead-containing coatings or paint are present – manual demolition of structures, manual scraping and heat gun applications
- Level 2 trigger tasks: presumed exposure above  $100 \mu\text{g}/\text{m}^3$ 
  - Where lead-containing coatings or paint are present – manual sanding, power tool cleaning, grinding or sanding with dust collection systems
  - Spray painting with lead paint

## Washington

- Basic rules, work generally covered under the scope of the rule:
  - Worker exposure to airborne lead  $\geq 1.5 \mu\text{g}/\text{m}^3$
  - Work with molten metals  $>0.0001\%$  lead
  - Hot work, burning or otherwise aerosolizing materials with  $0.005\%$  lead
  - Work that pulverizes materials with  $0.06\%$  lead
  - Work that manipulates materials at ambient temperatures with  $\geq 0.5\%$  lead
  - Work with paints or coatings with  $>1 \mu\text{g}/\text{cm}^2$  of lead
  - Work that leaves free lead on surfaces at  $\geq 4.3 \mu\text{g}/\text{dm}^2$

# Other trigger levels (C), continued

## Michigan

- Presumed exposure above 500  $\mu\text{g}/\text{m}^3$ : using lead containing mortar, lead burning; where lead containing coatings or paints are present – rivet busting, power tool cleaning without dust collection systems, cleanup activities where dry expendable abrasives are used and abrasive blasting enclosure movement and removal
- Presumed exposure above 2,500  $\mu\text{g}/\text{m}^3$ : abrasive blasting, welding, cutting and torch burning
- For tasks not listed, where the employer has reason to believe the employee performing a task may be exposed in excess of the PEL, the employer must provide interim protection until exposure assessment is obtained

## California

- Level 3 trigger tasks: presumed exposure above 500  $\mu\text{g}/\text{m}^3$ 
  - Using lead-containing mortar or lead burning
  - Where lead-containing coatings or paint are present – rivet busting, power tool cleaning or grinding, or sanding without dust collection systems, cleanup activities where dry expendable abrasives are used, abrasive blasting enclosure movement and removal, abrasive blasting, welding, torch cutting and torch burning
- Trigger tasks, not listed: where the employer has reason to believe the employee performing a task may be exposed in excess of the PEL, must provide interim protection until exposure assessment is obtained

## Washington

- Basic rules, work potentially covered under the scope of the rule:
  - Work with lead coatings, suspect coatings (facility construction prior to 1978, corrosion protection coatings, etc.), lead containing productions (lead shot, fishing sinkers, solder, slag, precious metals, etc.) and other materials that may contain lead



# Other trigger levels, interim protection, safe harbor (C)

## Michigan (“employee protective measures”)

- No changes from 1926.62(d)(2)(v)
- Interim protection:
  - Appropriate respiratory protection
  - Appropriate personal protective clothing and equipment
  - Change areas
  - Hand washing facilities
  - Biological monitoring
  - Training

## California (“interim protection”)

- Prior to performing an exposure assessment, employers shall provide employees performing trigger tasks with interim protection:
  - Appropriate respiratory protection
  - Appropriate protective work clothing and equipment
  - Change areas
  - Shower facilities
  - Eating facilities or eating areas
  - Regulated areas
  - Limiting the maximum amount of time an employee can conduct dry abrasive blasting to five hours a day until 2030, when it shall be limited to two hours a day
  - Medical surveillance
  - Training

## Washington (“safe harbor”)

- Industry-specific protocols with limited scope that provide alternate compliance guidelines for employees in those industries
- Contains provisions for:
  - Handling lead containing articles in retail setting
  - Managing lead paint in office and residential settings
  - Incidental lead paint in construction and RRP work
  - Gun range work
  - Clean areas (workplaces with lead exposure, but referring to the workers in clean areas not assigned lead related tasks)
  - Well managed blood lead levels (more flexibility offered to employers that demonstrate they have an effective program in place for managing employee BLLs)
  - Maintenance and repair work

# Medical surveillance, triggers (GI)

## Michigan

- No change from 1910.1025(j)(1)
- Medical surveillance instituted for:
  - All employees exposed at or above the AL for more than 30 days a year
  - Prior to assignment for employees being assigned to an area above the action level 1025(j)(3)(i)(c).

## California

- Medical surveillance instituted for:
  - All employees exposed at or above the AL
  - As interim protection for employees performing PSLW
- Exception: Medical surveillance not required if not exposed above the AL for 30 or more days in any 12 months and if not exposed on any day at or above  $10 \mu\text{g}/\text{m}^3$  as an 8-hr TWA.
- Exception: Medical surveillance not required if not exposed above the AL for 15 or more days in any 12 consecutive months and if not exposed on any day above  $20 \mu\text{g}/\text{m}^3$  as an 8-hr TWA.

## Washington

- N/A

# Medical surveillance, triggers (C)

## Michigan

- Initial medical for exposure at or above the AL on any day (no change from 1926.62)

## California

- Medical surveillance instituted for:
  1. All employees exposed at or above the AL
  2. As interim protection for employees performing trigger tasks
- Exception: Medical surveillance not required if not exposed above the AL for 30 or more days in any 12 months and if not exposed on any day at or above 10  $\mu\text{g}/\text{m}^3$  as an 8-hr TWA.
- Exception: Medical surveillance not required if not exposed above the AL for 15 or more days in any 12 consecutive months and if not exposed on any day above 20  $\mu\text{g}/\text{m}^3$  as an 8-hr TWA.

## Washington

- N/A

# Blood lead levels (GI)

## Michigan

- BLL of 15  $\mu\text{g}/\text{dL}$  = increase BLL analysis to every two months, require notification in writing of results, and provided at least annual medical examinations
- Temporary medical removal = at or above 30  $\mu\text{g}/\text{dL}$ , or if average of last three BLLs is 20  $\mu\text{g}/\text{dL}$

## California

- BLL of 10  $\mu\text{g}/\text{dL}$  = increase BLL analysis to every two months, employer must develop written elevated blood lead level response plan for employee and provide training about lowering blood lead levels
- BLL of 20  $\mu\text{g}/\text{dL}$  = provide a medical examination as soon as possible and annual medical examinations thereafter, until BLL is below 20  $\mu\text{g}/\text{dL}$
- Temporary medical removal (for employees exposed at or above the AL, altering or disturbing material containing lead  $\geq 0.5\%$  by weight, or torch cutting scrap metal) = at or above 30  $\mu\text{g}/\text{dL}$ , or if the past two BLLs are at or above 20  $\mu\text{g}/\text{dL}$ , or if the average of BLLs from the past six months is at or above 20

## Washington

- BLL of 5  $\mu\text{g}/\text{dL}$  = advisory level; workers will be advised of elevated BLL
- BLL of 10  $\mu\text{g}/\text{dL}$  = control level; employer must review exposures, work practices and controls, and document action plans to reduce worker exposures
- Temporary medical removal = at or above 30  $\mu\text{g}/\text{dL}$ , or if two tests conducted four to eight weeks apart indicated BLLs above 20  $\mu\text{g}/\text{dL}$

# Blood lead levels (C)

## Michigan

- BLL of 15  $\mu\text{g}/\text{dL}$  = increase BLL analysis to every two months, require notification in writing of results, and provided at least annual medical examinations
- Temporary medical removal = at or above 30  $\mu\text{g}/\text{dL}$ , or if average of last three BLLs is 20  $\mu\text{g}/\text{dL}$

## California

- BLL of 10  $\mu\text{g}/\text{dL}$  = increase BLL analysis to every two months, employer must develop written elevated blood lead level response plan for employee and provide training about lowering blood lead levels
- BLL of 20  $\mu\text{g}/\text{dL}$  = provide a medical examination as soon as possible and annual medical examinations thereafter, until BLL is below 20  $\mu\text{g}/\text{dL}$
- Temporary medical removal (for employees exposed at or above the AL, involving a trigger task where no exposure assessment had been conducted, or altering or disturbing material containing lead  $\geq 0.5\%$  by weight) = at or above 30  $\mu\text{g}/\text{dL}$ , or if the last two BLLs are at or above 20  $\mu\text{g}/\text{dL}$ , or if the average of BLLs from the past six months is at or above 20

## Washington

- BLL of 5  $\mu\text{g}/\text{dL}$  = advisory level; workers will be advised of elevated BLL
- BLL of 10  $\mu\text{g}/\text{dL}$  = control level; employer must review exposures, work practices and controls, and document action plans to reduce worker exposures
- Temporary medical removal = at or above 30  $\mu\text{g}/\text{dL}$ , or if two tests conducted four to eight weeks apart indicated BLLs above 20  $\mu\text{g}/\text{dL}$

# Blood lead levels, schedule (GI)

## Michigan

- BLL testing provided for employees exposed to lead above the AL for more than 30 days a year
- Schedule for BLLs:
  - Every six months for each employee
  - Every two months for each employee whose BLL was at or above 15 µg/dL
  - At least monthly during the period of temporary removal due to elevated BLLs

## California

- BLL testing provided for employees included in medical surveillance program (exposed above the AL and as interim protection for PSLW)
- Schedule for BLLs:
  - Prior to assignment to work above the AL and PSLW
  - Every two months for the first six months, then every six months
  - Every two months for each employee whose last BLL was at or above 10 µg/dL but below 20 µg/dL
  - At least monthly for employees whose BLL was at or above 20 µg/dL, and during the period of temporary removal due to elevated BLLs

## Washington

- Basic rules (lead containing material, but not over ALs, PEL or SPEL): must make BLL testing available when requested by employees
- Action, PEL and SPEL rules: BLL monitoring if employees are exposed above any lead AL for >10 days a year
- Schedule for BLLs:
  - Initial BLL conducted prior to starting lead work
  - Every two months for the first six months, then every six months for workers exposed at or above any action level
  - Within two weeks after a worker stops participating in lead work
  - Every two months for employees with BLL above 10 µg/dL
  - At least monthly during periods of temporary medical removal

# Blood lead levels, schedule (C)

## Michigan

- Initial BLL provided for employees exposed to lead above the AL on any day
- Additional BLL program established for employees exposed to lead above the AL for more than 30 days a year

## California

- Initial blood lead testing is required:
  - Prior to assignment to work where exposure to lead is or is expected to be at or above the action level
  - As interim protection, prior to performing trigger tasks
- Exception 1: Initial blood lead testing not required for employees not exposed to lead at or above the action level for 30 or more days in any 12 consecutive months and not exposed on any day above  $10 \mu\text{g}/\text{m}^3$  as an 8-hour TWA
- Exception 2: Initial blood lead testing not required for employees not exposed to lead at or above the action level for 15 or more days in any 12 consecutive months and not exposed on any day above  $20 \mu\text{g}/\text{m}^3$  as an 8-hour TWA
- Exception 3: Initial blood lead testing is not required for an employee who has had a blood lead test in the preceding two months.

## Washington

- Basic rules (lead containing material, but not over ALs, PEL or SPEL): must make BLL testing available when requested by employees
- Action, PEL and SPEL rules: BLL monitoring if employees are exposed above any lead AL for >10 days a year

# Blood lead levels, schedule (C), continued

## Michigan

- Schedule for BLLs:
  - Every two months for the first six months, then every six months
  - Every two months for each employee whose BLL was at or above 15 µg/dL
  - At least monthly during the period of temporary removal due to elevated BLLs

## California

- Schedule for BLLs:
  - Every two months for the first six months, then every six months, for employees exposed to lead above the action level and/or as interim protection for employees performing trigger tasks
  - Every two months for each employee whose last BLL was at or above 10 µg/dL, but below 20 µg/dL
  - At least monthly for employees whose BLL was at or above 20 µg/dL, and during the period of temporary removal due to elevated BLLs
  - At least monthly, as interim protection, for each employee performing a level 3 trigger task, including a BLL taken within three days after discontinuing all level 3 trigger work
  - At least monthly for each employee whose airborne exposure is above 500 µg/m<sup>3</sup> as an 8-hr TWA including a BLL taken within three days after discontinuing all work associated with exposure above 500 µg/m<sup>3</sup>

## Washington

- Schedule for BLLs:
  - Initial BLL conducted prior to starting lead work
  - Every two months for the first six months, then every six months, for workers exposed at or above any action level
  - Within two weeks after a worker stops participating in lead work
  - Every two months for employees with BLL above 10 µg/dL
  - At least monthly during periods of temporary medical removal



# Blood lead levels, return to work (GI)

## Michigan

- Employee can return to work when two consecutive blood sampling tests indicate BLL <15 µg/dL

## California

- Employee can return to work when two consecutive blood sampling tests, taken 30 days apart, indicate BLL <15 µg/dL

## Washington

- Employee can return to work when two consecutive blood sampling tests, taken at least 14 days apart, indicate BLL <15 µg/dL

# Blood lead levels, return to work (C)

## Michigan

- Employee can return to work when two consecutive blood sampling tests indicate BLL <15 µg/dL

## California

- Employee can return to work when two consecutive blood sampling tests, taken 30 days apart, indicate BLL <15 µg/dL

## Washington

- Employee can return to work when two consecutive blood sampling tests, taken at least 14 days apart, indicate BLL <15 µg/dL

# Medical examinations, content (GI)

## Michigan

- Removed the requirement for zinc protoporphyrin from 1910.1025(j)(3)(ii)

## California

- Kept requirement for zinc protoporphyrin, but only if BLL was at or above 20 µg/dL
- Specifies what must be included in the physician's written medical report for the employee versus what must be included in the physician's written medical opinion for the employer

## Washington

- Kept requirement for zinc protoporphyrin
- Added explicit requirement for exam content to include discussion of hobbies and dietary habits (including medicals, supplements and vitamins)
- Removed requirement for physical examination to include particular attention to teeth and gums

# Medical examinations, content (C)

## Michigan

- Removed the requirement for zinc protoporphyrin from 1926.62(j)(3)(ii)

## California

- Kept requirement for zinc protoporphyrin, but only if BLL was at or above 20  $\mu\text{g}/\text{dL}$
- Specifies what must be included in the physician's written medical report for the employee versus what must be included in the physician's written medical opinion for the employer

## Washington

- Kept requirement for zinc protoporphyrin
- Added explicit requirement for exam content to include discussion of hobbies and dietary habits (including medicals, supplements and vitamins)
- Removed requirement for physical examination to include particular attention to teeth and gums

# Medical removal protections (GI)

## Michigan

- No changes from 1910.1025(k)(2)

## California

- No major changes from 1910.1025(k)(2)

## Washington

- Medical removal benefits may be terminated for workers hired on a temporary or project basis for work that has concluded, unless:
  - The employer continues with the lead related tasks after the worker's contract period concludes
  - A worker's occupation specifically involves lead and their ongoing elevated lead levels will prevent gainful employment with another employer

# Medical removal protections (C)

## Michigan

- No changes from 1926.62(k)(2)

## California

- No major changes from 1926.62(k)(2)

## Washington

- Medical removal benefits may be terminated for workers hired on a temporary or project basis for work that has concluded, unless:
  - The employer continues with the lead related tasks after the worker's contract period concludes
  - A worker's occupation specifically involves lead and their ongoing elevated lead levels will prevent gainful employment with another employer

# Exposure monitoring (GI)

## Michigan

- No changes from 1910.1025(d)
- Frequency of air monitoring:
  - Initial monitoring
  - If  $>50 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If  $\geq 30 \mu\text{g}/\text{m}^3$  but  $\leq 50 \mu\text{g}/\text{m}^3$ , repeat every six months
  - If  $< 30 \mu\text{g}/\text{m}^3$ , do not need to repeat unless change in process

## California

- Frequency of air monitoring:
  - Initial monitoring
  - If  $>50 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If  $\geq 30 \mu\text{g}/\text{m}^3$  but  $\leq 50 \mu\text{g}/\text{m}^3$ , repeat every six months
  - If  $\geq 2 \mu\text{g}/\text{m}^3$  but  $< 30 \mu\text{g}/\text{m}^3$ , repeat annually
  - If  $< 2 \mu\text{g}/\text{m}^3$ , do not need to repeat unless change in process

## Washington

- Must assess materials used or present in the workplace for lead content and determine what rules apply to work: basic rules conditions, action level conditions, PEL conditions or SPEL conditions
- Frequency of air monitoring:
  - Initial monitoring
  - If  $\geq 20 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If above any of the action levels (including airborne  $\geq 10 \mu\text{g}/\text{m}^3$ ), repeat every six months

# Exposure monitoring (C)

## Michigan

- No changes from 1926.62(d)(6)
- Frequency of air monitoring:
  - Initial monitoring
  - If  $>50 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If  $\geq 30 \mu\text{g}/\text{m}^3$  but  $\leq 50 \mu\text{g}/\text{m}^3$ , repeat every six months
  - If  $< 30 \mu\text{g}/\text{m}^3$ , do not need to repeat unless change in process

## California

- Frequency of air monitoring:
  - Initial monitoring
  - If  $>50 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If  $\geq 30 \mu\text{g}/\text{m}^3$  but  $\leq 50 \mu\text{g}/\text{m}^3$ , repeat every six months
  - If  $\geq 2 \mu\text{g}/\text{m}^3$  but  $< 30 \mu\text{g}/\text{m}^3$ , repeat annually
  - If  $< 2 \mu\text{g}/\text{m}^3$ , do not need to repeat unless change in process

## Washington

- Must assess materials used or present in the workplace for lead content and determine what rules apply to work: basic rules conditions, action level conditions, PEL conditions or SPEL conditions
- Frequency of air monitoring:
  - Initial monitoring
  - If  $\geq 20 \mu\text{g}/\text{m}^3$ , repeat quarterly
  - If above any of the action levels (including airborne  $\geq 10 \mu\text{g}/\text{m}^3$ ), repeat every six months



# Personal protective equipment (GI)

## Michigan

- No changes from 1910.1025(g)
- PPE required for:
  - Employees exposed above the PEL
  - Employees for whom skin or eye irritation may occur from exposure to lead
- Provide PPE at least weekly for employees exposed above the PEL and daily for employees exposed above  $200 \mu\text{g}/\text{m}^3$

## California

- PPE required for:
  - Employees exposed above the PEL
  - An interim protection for employees performing PSLW
  - Employees for whom skin or eye irritation may occur from exposure to lead
- Provide PPE at least weekly for employees exposed above the PEL and daily for employees exposed above  $30 \mu\text{g}/\text{m}^3$

## Washington

- Basic and action rules:
  - PPE is suggested, must be included in the employer's PPE hazard assessment
- PEL rules:
  - PPE required
  - Repair, replace or launder PPE at least weekly and when visibly contaminated
- SPEL rules:
  - PPE required
  - Replace or launder PPE at least daily

# Personal protective equipment (C)

## Michigan

- No changes from 1926.62(g)
- PPE required for:
  - Employees exposed above the PEL
  - Employees for whom skin or eye irritation may occur from exposure to lead
  - As interim protection for employees performing trigger construction work listed in (d)(2)
- Provide PPE at least weekly for employees exposed above the PEL and daily for employees exposed above  $200 \mu\text{g}/\text{m}^3$

## California

- PPE required for:
  - Employees exposed above the PEL
  - An interim protection for employees performing trigger tasks
  - Employees for whom skin or eye irritation may occur from exposure to lead
- Provide PPE at least weekly for employees exposed above the PEL and daily for employees exposed above  $30 \mu\text{g}/\text{m}^3$

## Washington

- Basic and action rules:
  - PPE is suggested, must be included in the employer's PPE hazard assessment
- PEL rules:
  - PPE required
  - Repair, replace or launder PPE at least weekly and when visibly contaminated
- SPEL rules:
  - PPE required
  - Replace or launder PPE at least daily

# Housekeeping (GI)

## Michigan

- No changes from 1910.1025(h)
- Surfaces maintained as free as practicable from lead accumulations
- Floor and surfaces may not be cleaned with compressed air

## California

- Surfaces maintained as free as practicable from lead accumulations
- Floors and surfaces shall not be cleaned with compressed air
- Floor and surfaces shall be cleaned, whenever possible, by vacuuming or by other methods that minimize likelihood of lead becoming airborne

## Washington

- Surfaces must be maintained as free as practicable of lead dust and debris
- Specifics about how to conduct wet cleaning (such as mopping) to assure lead is removed from the surface and not redeposited
- If exposures above the PEL/SPEL, employer must address housekeeping procedures as part of its lead exposure control plan

# Housekeeping (C)

## Michigan

- No changes from 1926.62(h)
- Surfaces maintained as free as practicable from lead accumulations
- Compressed air shall not be used to remove lead from any surface unless used in conjunction with ventilation designed to capture airborne dust created by compressed air

## California

- Surfaces maintained as free as practicable from lead accumulations
- Compressed air shall not be used to remove lead from any surface unless used in conjunction with ventilation designed to capture airborne dust created by compressed air
- Floor and surfaces shall be cleaned, whenever possible, by vacuuming or by other methods that minimize likelihood of lead becoming airborne

## Washington

- Surfaces must be maintained as free as practicable of lead dust and debris
- Specifics about how to conduct wet cleaning (such as mopping) to assure lead is removed from the surface and not redeposited
- If exposures above the PEL/SPEL, employer must address housekeeping procedures as part of its lead exposure control plan

# Hygiene (GI)

## Michigan

- No changes from 1910.1025(i)
- At any level of lead (i.e. less than airborne PEL):
  - No additional requirements

## California

- At any level of lead:
  - Must prohibit use of food, beverages, tobacco and cosmetics in areas with lead
  - Must provide special cleansing compounds designed to remove lead if necessary
  - Employees must wash hands, arms and face prior to entering hygiene areas and at the end of their shift
  - Must maintain and implement written procedures for cleaning hygiene areas, including drinking and washing facilities, showers and lunchrooms
  - Exception: If employees are exposed to  $\leq 50 \mu\text{g}/\text{m}^3$  without regard to the use of respirators, the employer may provide employees with access to potable drinking water. The employer must implement, provide training on and ensure compliance with written safe hydration procedures. The employer must be able to demonstrate that employees following these procedures are not exposed to lead above the PEL, and that water is consumed in a manner that prevents the ingestion of lead.

## Washington

- Basic and action rules:
  - Must provide facilities for employees to wash hands and face and ensure they are used during breaks and at the end of the shift
  - Washing facilities must be located near or next to work activities with lead exposure
  - Exception: when drinking water is supplied for hydration related to heat stress, handwashing is not necessary when a hands-free fountain is used to prevent ingestion of lead

# Hygiene (GI), continued

## Michigan

- At the PEL (50  $\mu\text{g}/\text{m}^3$ ):
  - Must prohibit use of food, beverages, tobacco and cosmetics in areas with lead
  - Must provide change rooms, showers and lunchrooms

## California

- At the PEL (10  $\mu\text{g}/\text{m}^3$ ):
  - Must provide change rooms, showers and lunchrooms

## Washington

- PEL rules (20  $\mu\text{g}/\text{m}^3$ ):
  - Must provide showers, change rooms and lunchrooms
  - Workers must remove PPE, wash hands and faces, and may not leave workplace wearing any clothing or equipment worn while working in lead exposure area
- SPEL rules (50  $\mu\text{g}/\text{m}^3$ ):
  - Employer must ensure employees effectively decontaminate before leaving the worksite

# Hygiene (C)

## Michigan

- No changes from 1926.62(i)
- At any level of lead (i.e. below the airborne PEL):
  - No additional requirements

## California

- At any level of lead:
  - Must prohibit use of food, beverages, tobacco and cosmetics in areas with lead
  - Must provide adequate number of washing facilities, lavatories and special cleansing compounds
  - Employees must wash hands, arms and face prior to entering hygiene areas and at the end of their shift
  - Must maintain and implement written procedures for cleaning hygiene areas, including drinking and washing facilities, change rooms, showers and eating areas

## Washington

- Basic and action rules:
  - Must provide facilities for employees to wash hands and face and ensure they are used during breaks and at the end of the shift
  - Washing facilities must be located near or next to work activities with lead exposure
  - Exception: when drinking water is supplied for hydration related to heat stress, handwashing is not necessary when a hands-free fountain is used to prevent ingestion of lead

# Hygiene (C), continued

## Michigan

- At the PEL (50  $\mu\text{g}/\text{m}^3$ ):
  - Must prohibit use of food, beverages, tobacco and cosmetics in areas with lead
  - Must provide change areas, showers (when feasible), eating facilities and hand washing facilities

## California

- At the PEL (10  $\mu\text{g}/\text{m}^3$ ) and as interim protection:
  - Must provide change rooms, showers and eating facilities
- Exception: Shower facilities are not required when the employer can demonstrate that shower facilities are not feasible.

## Washington

- PEL rules (20  $\mu\text{g}/\text{m}^3$ ):
  - Must provide showers, change rooms and lunchrooms
  - Workers must remove PPE, wash hands and faces, and may not leave workplace wearing any clothing or equipment worn while working in lead exposure area
- SPEL rules (50  $\mu\text{g}/\text{m}^3$ ):
  - Employer must ensure employees effectively decontaminate before leaving the worksite



# Training (GI)

## Michigan

- No change from 1910.1025(l)
- If exposure to lead at any level, must inform employees of the contents of Appendices A and B
- If exposed at or above the AL or if potential for skin or eye irritation, must implement training program

## California

- If a workplace falls within the scope of the standard, must inform employees of the content of Appendices A and B
- For all employees occupationally exposed to lead, training on housekeeping and hygiene requirements [regarding general hygiene and safe hydration procedures in (i)(1) and (i)(5)] shall be provided
- Must implement training program for employees exposed at or above the AL, for employees with potential skin or eye irritation and as interim protection for employees performing PSLW
- Training program includes the requirement to train about: hygiene practices; cardiovascular and chronic health hazards associated with lead; damage caused to reproductive systems at low levels; the possibility of lead contamination of vehicles; and the potential for take-home lead, etc.

## Washington

- Basic rules: provide training about lead in the workplace, health effects of lead, basic precautions for workers and any work practices in place to prevent lead exposure
- Action rules: basic rules training, plus steps workers can take to protect themselves from lead (including exposure controls, emergency procedures, PPE), training about the contents of the lead standard, and information about BLLs and medical examinations
- PEL and SPEL rules: include basic and action rules training, plus information about the employer's lead exposure control plan

# Training (C)

## Michigan

- No change from 1926.62(I)
- If exposure to lead at any level, must implement training program

## California

- Must implement training program for employees exposed at or above the AL, for employees with potential skin or eye irritation and as interim protection for employees performing trigger tasks
- Training program includes the requirement to train about: the contents of the standard and the appendices; the importance of hygiene practices; the cardiovascular and chronic health hazards associated with lead; the damage caused to reproductive systems at low levels; the routes of exposure for lead (including inhalation and ingestion); the possibility of lead contamination of vehicles; and the potential for take-home lead

## Washington

- Basic rules: provide training about lead in the workplace, health effects of lead, basic precautions for workers and any work practices in place to prevent lead exposure
- Action rules: basic rules training, plus steps workers can take to protect themselves from lead (including exposure controls, emergency procedures, PPE), training about the contents of the lead standard, and information about BLLs and medical examinations
- PEL and SPEL rules: include basic and action rules training, plus include information about the employer's lead exposure control plan

# Appendix A – substance data sheet for lead (GI)

## Michigan

- Added short-term effects of lead on nervous system, cardiovascular, miscarriage, etc.
- Included cardiovascular and high blood pressure as chronic effects
- Health protection goals of standard include keeping worker BLLs as low as possible
- Removed specific numerical BLL guidance, replaced with statements to keep BLLs as low as possible

## California

- Added more examples of lead work
- Updated PEL and AL information
- Included reproductive effect, miscarriage and reduced birthweight in short-term effects
- Emphasized the variety of adverse health outcomes that can occur at any low level of lead
- Added specific sections in chronic overexposures for cardiovascular system, neurological system, renal system, reproductive system and blood forming system, and discussed the health outcomes in each system
- Health protection goals of standard include keeping worker BLLs as low as possible
- Removed some specific numerical BLL guidance, replaced with statements to keep BLLs as low as possible, kept some BLL numbers regarding encephalopathy levels (80-150 µg/dL)

## Washington

- Not available

# Appendix A – substance data sheet for lead (C)

## Michigan

- Added short-term effects of lead on nervous system, cardiovascular, miscarriage, etc.
- Included cardiovascular and high blood pressure as chronic effects
- Health protection goals of standard include keeping worker BLLs as low as possible
- Removed specific numerical BLL guidance, replaced with statements to keep BLLs as low as possible

## California

- Updated PEL and AL information
- Included reproductive effect, miscarriage and reduced birthweight in short-term effects
- Emphasized the variety of adverse health outcomes that can occur at any low level of lead
- Added specific sections in chronic overexposures for cardiovascular system, neurological system, renal system, reproductive system and blood forming system, and discussed the health outcomes in each system
- Health protection goals of standard include keeping worker BLLs as low as possible
- Removed some specific numerical BLL guidance, replaced with statements to keep BLLs as low as possible, kept some BLL numbers regarding encephalopathy levels (80-150 µg//dL)

## Washington

- Not available

# Appendix B – employee standard summary (GI)

## Michigan

- Changed BLL numbers under the medical surveillance section to 15 µg/dL
- Removed ZPP mentions in medical surveillance section
- Removed mentions of alternate BLL thresholds for the first year the standard was in effect (80 µg/dL) in medical surveillance and medical removal sections
- Updated the list of commonly used chelation agents [succimer, meso 2, and 3-dimercaptosuccinic acid (DMSA)]

## California

- Changed PEL and AL, and included discussion about PHLW definitions and interim protection
- Updated air monitoring frequency guidelines
- Added SECAL information
- Required filtering facepiece respirators not be used to protect against lead and HEPA filters are to be used in PAPRs and non-powered air purifying respirators
- Specified hand washing facilities are to be provided and used for any occupational lead exposure (not just above the PEL)
- Added section under medical surveillance for blood lead testing requirements

## Washington

- Not available

- Removed mentions of alternate BLL thresholds for the first year the standard was in effect (80 µg/dL)
- Added specification that employees must receive a copy of the physician's written medical opinion
- Updated the list of commonly used chelation agents [succimer and calcium disodium EDTA (Ca Na<sub>2</sub> EDTA)]
- Updated medical removal requirements

# Appendix B – employee standard summary (C)

## Michigan

- Added a duplicate paragraph under the respiratory protection section and allowed MSHA-approved respirators to be used
- Changed BLL numbers in medical surveillance section to 15 µg/dL
- Removed ZPP mentions in medical surveillance section
- Updated the list of commonly used chelation agents [succimer, meso 2, and 3-dimercaptosuccinic acid (DMSA)]

## California

- Changed PEL and AL, and included discussion about trigger definitions and interim protection
- Updated air monitoring frequency guidelines
- Required that filtering facepiece respirators not be used to protect against lead and HEPA filters are to be used in PAPRs and non-powered air purifying respirators
- Required showers be provided and used when employees are exposed above the PEL and as interim protection for trigger tasks (removed the “if feasible” component)
- Added section under medical surveillance for blood lead testing requirements

## Washington

- Not available

- Added specification that employees must receive a copy of the physician’s written medical opinion
- Updated the list of commonly used chelation agents [succimer and calcium disodium EDTA (Ca Na<sub>2</sub> EDTA)]
- Updated medical removal requirements
- Explicitly stated the employer must include lead in its hazard communication program

# Appendix C – medical surveillance information (GI)

## Michigan

- Removed ZPP requirement, but kept information regarding the ZPP test
- Created table 1, which provided medical surveillance frequency information in relation to measured BLLs
- Arranged the listed guidance in the medical evaluation section into tables
- Removed ZPP pros from the laboratory evaluation section and added ZPP limitations

## California

- Changes throughout to reflect lower AL and PELs, PSLW, updated frequency for BLL tests and medical surveillance
- Added a table (table 1) detailing minimum requirements for BLL and medical surveillance (frequency of these tests and who is eligible)
- Added table 2 discussing guidelines for medical removal and protections
- Added section about requirements to provide information to laboratories, employees, employers and health care providers, as well as the requirement for physicians to explain the results of the medical examination to employees in writing within 30 days
- Changed the laboratory evaluation section to include updating information about BLLs and ZPP, including the requirement for a ZPP test when BLLs are >20 ug/dL

## Washington

- Not available

# Appendix C – medical surveillance information (GI), continued

## Michigan

- Regarding the adverse health effects of lead (section 2):
  - Added information about lead resulting in essential tremor
  - Added section for cardiovascular effects
  - Added additional information to neurological, renal, gastrointestinal and heme synthesis sections
  - Added section about lead as a probable human carcinogen
  - Added guidance about recommended BLL for fetus, children and pregnant workers in the reproductive effects section, and added statement regarding take-home lead

## California

- Regarding the adverse health effects of lead (section 2):
  - Emphasized even low levels of lead can be hazardous
  - Added a section about how lead impacts mechanisms of disease (interfering with calcium metabolism)
  - Added section discussing cardiovascular effects
  - Added and updated information about what BLLs have been linked to health outcomes (neurological essential tremor at BLLs <10 ug/dL)
  - Listed lead as a probable human carcinogen

## Washington

- Not available



# Appendix C – medical surveillance information (C)

## Michigan

- Removed ZPP requirement, but kept information regarding the ZPP test
- Created table 1, which provided medical surveillance frequency information in relation to measured BLLs
- Arranged the listed guidance in the medical evaluation section into tables
- Removed ZPP pros from laboratory evaluation section and added ZPP limitations

## California

- Changes throughout to reflect lower AL and PELs, trigger work and updated frequency for BLL tests and medical surveillance
- Added a table (table 1) detailing minimum requirements for BLL and medical surveillance (frequency of these tests and who is eligible)
- Added table 2 discussing guidelines for medical removal and protections
- Added section about requirements to provide information to laboratories, employees, employers and health care providers, as well as the requirement for physicians to explain the results of the medical examination to employees in writing within 30 days
- Changed the laboratory evaluation section to include updating information about BLLs and ZPP, including the requirement for a ZPP test when BLLs are >20 ug/dL

## Washington

- Not available

# Appendix C – medical surveillance information (C), continued

## Michigan

- Regarding the adverse health effects of lead:
  - Added information about lead resulting in essential tremor
  - Added section for cardiovascular effects
  - Added additional information to neurological, renal, gastrointestinal and heme synthesis sections
  - Added section about lead as a probable human carcinogen
  - Added guidance about recommended BLL for fetus, children and pregnant workers in the reproductive effects section

## California

- Regarding the adverse health effects of lead:
  - Emphasized even low levels of lead can be hazardous
  - Added a section about how lead impacts mechanisms of disease (interfering with calcium metabolism)
  - Added section discussing cardiovascular effects
  - Added and updated information about what BLLs have been linked to health outcomes (neurological essential tremor at BLLs <10 ug/dL)
  - Listed lead as a probable human carcinogen

## Washington

- Not available

Thank you

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