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A Summary of Cal/OSHA's Lead in Construction Standard
Title 8 CCR Section 1532.1

NOTE: This standard originally became effective on November 4, 1993, shortly after the federal standard (29 CFR 1926.62). California's standard has since been revised; revisions that represent the additional requirements in California are highlighted by underlining. A copy of the complete Cal/OSHA standard, in a reformatted, easier-to-read version, is available from the Occupational Lead Poisoning Prevention Program at (510) 622-4332 or visit www.dhs.ca.gov/ohb. The federal standard is available from Federal OSHA Publications Office at (415) 744-7112.

(a) Scope

This standard covers all construction work where an employee may be exposed to lead, including metallic lead, inorganic lead compounds, and organic lead soaps, but not organic lead compounds.

(b) Definitions

An airborne lead level of 30 µg/m^3 is called the Action Level (AL). Having airborne lead concentrations at or above the AL triggers certain health and safety measures described in this standard.

(c) Permissible Exposure Limit (PEL)

The 8-hour Permissible Exposure Limit (PEL) is 50 µg/m^3 of airborne lead. If the work day is longer than 8 hours, the PEL is 400/number of hours worked per day. The employer must ensure that no employee is exposed to lead at concentrations over the PEL.

(d) Exposure Assessment

Exposure assessment must be performed in all workplaces where employees may be exposed to lead.

(d)(2) Protection of Employees During Assessment of Exposure

Three sets of specified tasks (often referred to as "trigger tasks") trigger basic protective measures where lead is present, until the employer performs an employee exposure assessment. (Exposure assessment is an initial determination via air monitoring, or previous monitoring of a very similar job within the last 12 months.)

For all three sets of tasks, employers are required to provide the following basic protective measures until air monitoring indicates exposure levels are at or below the PEL:

- ❑ Appropriate respiratory protection (type of respirator is specified according to assumed airborne lead level and requirements of Table 1 on page 6).
- ❑ Appropriate personal protective equipment - clean work clothes such as coveralls at least weekly (daily if greater than 200 µg/m^3 lead in air); gloves, hats, shoes or disposable shoe coverlets, face shields, vented goggles or other appropriate equipment.
- ❑ Change areas with separate storage facilities for work and street clothes - the employer shall assure that employees do not leave the workplace with work clothes or equipment.
- ❑ Hand washing facilities - the employer shall assure that employees wash their hands and face at the end of each work shift.
- ❑ Biological monitoring - consisting of initial or baseline blood sampling for lead and zinc protoporphyrin (ZPP).
- ❑ Training - includes Hazard Communication, respirator and lead training.

Lowest Exposure Trigger Tasks:

Assume exposures greater than 50 and up to 500 µg/m^3 unless proven otherwise:

- where lead coatings or paint are present:
  - manual demolition of structures
  - manual scraping
  - manual sanding
  - heat gun applications
  - power tool cleaning with dust collection system
- spray painting with lead
- any other task where the employer has reason to believe employees may be exposed over the PEL.

Medium Exposure Trigger Tasks:

Assume exposures greater than 500 and up to 2,500 µg/m^3 unless proven otherwise:

- use of lead-containing mortar
- lead burning
- where lead coatings or paint are present:
  - rivet busting

- power tool cleaning without dust collection systems
- cleanup of dry expendable abrasives
- abrasive blasting enclosure movement and removal

Highest Exposure Trigger Tasks:

Assume exposures greater than 2,500 $\mu g / m^3$ unless proven otherwise:

- where lead coatings or paint are present:
  - abrasive blasting
  - welding
  - cutting
  - torch burning

(d) Exposure Assessment (Air monitoring)

When air monitoring is conducted, the employer shall collect full-shift personal samples representative of an employee's regular, daily exposure to lead. Monitoring should include at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level. (For the initial determination, the employer may monitor only those employees expected to have the highest exposure levels.)

(d)(3) Basis of Initial Determination

The basis of initial determination, or initial assessment of employee exposure, will be employee exposure monitoring results and relevant considerations (e.g., observations, complaints) with the following two exceptions:

- ❑ Where the employer has previously monitored for lead exposures, and the data were obtained within the past 12 months during closely similar workplace operations and conditions, the employer may rely on the earlier results; or
- ❑ Where the employer has objective data, demonstrating that a particular product or material containing lead or specific process, operation or activity involving lead cannot result in an employee exposure to lead at or above the AL during processing, use or handling, the employer may rely upon such data instead of implementing initial monitoring. Objective data confirming that materials or surface coatings contain less than 0.06% (600 ppm) of lead may be used to demonstrate that employee exposure will not exceed the AL, as long as every unique surface or material has been sampled and analyzed**.**

Note ☞ Objective data are not permitted to be used for exposure assessment in connection with any of the trigger tasks listed under subsection (d)(2).

(d)(6) Frequency of Exposure Assessment

If the initial determination shows exposures less than the AL, no further assessment is needed until there has been a change of equipment, process, control, personnel or a new task has been initiated.

If the initial determination is at or above the AL but at or below the PEL, then monitoring shall be done at least every six months.

If the initial determination is above the PEL, then monitoring shall be done quarterly.

(d)(8) Employee Notification

Within 5 days after completion of the exposure assessment, the employer shall notify each employee in writing of the results which represent that employee's airborne lead exposure.

(e) Methods of Compliance

Exposures over the PEL shall be reduced through engineering, work practice and administrative controls, to the extent feasible. Respirators may be used to supplement other controls.

Prior to the commencement of any job where exposures may reach the PEL, the employer shall establish and implement a written compliance program, describing the lead-emitting activities and the means by which exposures will be controlled.

The compliance program shall provide for frequent, regular jobsite inspections by a person who is capable of identifying lead hazards and has authorization to take prompt corrective measures.

Where mechanical ventilation is used, the employer shall evaluate the performance as necessary to maintain effectiveness.

(f) Respiratory Protection

Where respirators are used, they shall be selected on the basis of air monitoring results, with the minimum level of respirator as indicated in Table 1 on page 6. Until monitoring results are available, the appropriate respirator is determined according to the assumed exposure associated with the task being performed, as per subsection (d)(2).

If an employee exhibits difficulty breathing with the respirator, the employer shall make available a medical examination to determine whether the employee can wear a respirator safely while performing the work.

PAPRs (powered air-purifying respirators) must be provided to any employee who requests one, where a PAPR would provide adequate protection as per Table 1.

Where respirators are used, the employer shall institute a complete, written respiratory protection program in accordance with Cal/OSHA's Respiratory Protection Standard, §5144. The program shall outline procedures for selection, use, training, cleaning and sanitizing, storage, inspection and maintenance of respirators. The program shall be evaluated by regular inspections.

§5144 requires that any respirators used shall be certified by NIOSH. Also, employers shall perform quantitative or qualitative fit testing of respirators at the time of initial fitting, and at least annually thereafter, for employees wearing tight-fitting facepiece respirators.

(g) Protective Work Clothing and Equipment

When an employee is exposed to lead above the PEL (without regard to whether a respirator is worn), or to lead compounds which may cause irritation, the employer shall provide and assure the employee uses appropriate protective work clothing, such as coveralls or other full-body work clothing, gloves, hats, shoes or shoe coverings, and face shields, goggles or other protective equipment as needed.

Work clothing shall be provided at least weekly for employees exposed over the PEL, except daily for those exposed at levels higher than $200\ \mu g/m^3$.

The employer shall provide for the cleaning or disposal of protective clothing and equipment. Clothing to be laundered must be placed in a closed container, labeled to indicate it contains lead, and the launderer must be notified of the potentially harmful effects of lead exposure. Cleaning of protective clothing or equipment by blowing, shaking or any other means that disperses lead into the air is prohibited.

(h) Housekeeping

All surfaces shall be maintained as free as practicable of accumulations of lead.

Vacuums equipped with toxic dust-removing HEPA filters are the preferred method of cleaning surfaces where lead accumulates. Other types of vacuums may not be used.

Shoveling, dry or wet sweeping, and brushing may be used only where HEPA vacuuming has been tried and found to be ineffective.

Use of compressed air for cleaning is prohibited, unless there is a ventilation system to capture the dust created by the compressed air.

(i) Hygiene Facilities, Practices and Regulated Areas

The employer shall assure that all employees exposed to lead above the PEL wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

The employer shall provide, for ALL employees exposed to lead, adequate hand washing facilities, and assures (in the absence of shower facilities) that employees wash their hands and face at the end of the work shift.

In areas where employees are exposed to lead above the PEL, the employer shall assure that food or beverages are not present or consumed, tobacco products are not present or used and cosmetics are not applied.

Employees exposed to lead above the PEL shall be provided with clean change areas with separate storage facilities for work and street clothing, to prevent cross-contamination.

The employer shall assure that employees do not leave the workplace wearing any protective clothing or equipment that was worn during the work shift.

Shower facilities, soap and towels shall be provided, where feasible, for employees exposed to lead above the PEL, and the employer shall assure that these employees shower at the end of the work shift.

Employees exposed to lead above the PEL shall be provided with a clean lunchroom or eating area. The employer shall assure that the lunch area is kept free from lead accumulation and that employees do not enter the lunch area with protective work clothing or equipment that has

not been cleaned by vacuuming or other method that limits dispersion of lead dust.

Employers shall establish regulated areas, where feasible, wherever employees are exposed above the PEL or performing trigger tasks (subsection (d)(2)). Warning signs shall be posted (subsection (m)), and access shall be restricted to authorized persons. Appropriate protective equipment shall be provided to and worn by employees and other persons who enter the regulated area.

(j) Medical Surveillance

The employer shall assure that the lead medical program (including all medical examinations and procedures performed) is under the supervision of a licensed physician.

The employee has the right to seek a second medical opinion regarding the lead medical evaluation, at the expense of the employer, and if necessary a third physician may be requested to resolve any disagreements between the first two.

Prophylactic chelation, the routine use of chelating drugs to lower blood lead levels in persons occupationally exposed to lead is prohibited.

(j)(2) Biological Monitoring

Initial blood sampling and analysis for blood lead levels (BLL) and zinc protoporphyrin (ZPP) are required for employees performing any of the specified trigger tasks, or for any employee exposed to an air lead level at or above the AL for at least 1 day.

Employees who are or may be exposed at or above the AL for more than 30 days in any consecutive 12 months, must be enrolled in a medical surveillance program, including BLL and ZPP at least every 2 months for the first 6 months, and every 6 months thereafter.

Any employee with a BLL at or above 40 µg/dl shall have a BLL and ZPP every two months until two consecutive samples are less than 40 µg/dl.

Any employee with a BLL above 50 µg/dl shall receive a follow-up BLL within 2 weeks after the employer receives the results of the first test.

For those employees temporarily removed from their jobs involving lead exposure (see subsection (k), Medical Removal Protection), a BLL and ZPP must be provided every month during the removal period.

All analysis of blood samples shall be conducted by a laboratory approved by OSHA.

The employer shall notify all employees, in writing, of their blood sampling results within 5 working days after receipt of the results.

(j)(3) Medical Examinations and Consultations

A medical exam shall be provided annually for all employees who had a BLL at or above 40 µg/dl during the preceding 12 months.

A medical exam shall be provided to any employee who reports signs or symptoms related to lead poisoning, desires medical advice regarding the effects of lead exposure on the employee's ability to produce a healthy child, is pregnant, or has difficulty breathing while wearing a respirator.

A medical exam shall be provided as medically appropriate to any employee removed from his/her usual job involving exposure to lead.

A medical exam shall include: detailed work history, with particular attention to past lead exposure; history and physical exam, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, neurological systems, and pulmonary system if respirators are used; blood pressure measurement; blood sample and analysis including BLL, ZPP, hemoglobin and hematocrit determinations, red cell indices, examination of peripheral smear morphology, blood urea nitrogen, serum creatinine; urinalysis with microscopic examination; pregnancy or male fertility evaluation, if requested by the employee; any other test deemed necessary by the physician.

(k) Medical Removal Protection (MRP)

(k)(1) Temporary Medical Removal and Return

The employer shall remove an employee from work involving exposure to lead at or above the AL on each occasion that a BLL and follow-up test is at or above 50 µg/dl.

An employee who has been removed due to an elevated BLL can return to his/her former job after having two consecutive BLLs at or below 40 µg/dl.

The employer shall remove an employee from work involving exposure to lead at or above the AL on each occasion that a final medical determination results in a medical finding,

determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

An employee who has been removed due to a final medical determination can return to his/her former job when a subsequent medical determination indicates he/she no longer has a medical condition which places that employee at increased risk of health impairment from exposure to lead.

(k)(2) Medical Removal Protection Benefits

As long as the job the employee was removed from continues, the employer shall provide up to 18 months of MRP benefits on each occasion that an employee is removed from exposure to lead.

MRP benefits means the normal earnings, seniority and other employment rights, and benefits, as though the employee had not been removed from the former job.

(l) Employee Information, Training and Certification

The employer shall provide information about lead hazards, according to the Hazard Communication Standard (Section 5194), to all employees exposed to lead.

For all employees exposed to lead at or above the AL on any day, exposed to lead compounds that cause eye or skin irritation, or who perform any of the specified trigger tasks, the employer shall provide initial (pre-placement) training that includes: the content of this standard and appendices; the operations that may cause lead exposure at or above the AL; the purpose, proper selection, fitting, use and limitations of respirators; the purpose and description of the medical surveillance program, including the adverse health effects of lead exposure (especially on reproduction); the engineering controls and work practices relevant to the employee's job assignment; the contents of any compliance plan in effect; the location of regulated areas; the prohibition against routine use of chelation agents; the employee's right of access to records.

For all employees exposed to lead at or above the AL on any day, the above training must be provided annually.

(l)(3) Training and Certification for Residential and Public Buildings

All employees and supervisors who are engaged in lead-related construction in residences or buildings generally accessible to the public, and shown to be exposed to lead at or above the PEL, shall be trained by state-accredited training providers and certified by the California Department of Health Services (CDHS).

[Call 1-800-597-LEAD for information about accredited training providers and CDHS certification.]

(m) Signs

In regulated areas (work areas where employee exposure is above the PEL and/or trigger tasks are performed), the employer shall post a warning sign with the words:

> WARNING: LEAD WORK AREA
>
> POISON - NO SMOKING OR EATING

(n) Record Keeping

The employer is required to maintain detailed records on exposure assessment, including any objective data used for exemption from air monitoring requirements, medical surveillance and medical removals.

(o) Observation of Monitoring

The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee lead exposure. Observers shall be provided with and use protective equipment if required in the area, receive an explanation of the measurement procedures, observe all steps related to monitoring, and receive copies of the results.

(p) Lead-Work Pre-Job Notification

The employer shall provide written notification to Cal/OSHA at least 24 hours before conducting lead-related construction work involving any of the "trigger tasks" listed in section (d)(2).

Notification is NOT required when any of the following situations exists:

1) the lead content of the materials being disturbed is less than 0.5%, 5,000 parts per million (weight by weight), or 1.0 mg/cm^2;
2) the amount of lead-containing materials to be disturbed is less than 100 square feet or 100 linear feet; or

3) the only (d)(2) task to be performed consists of torch cutting or welding for no longer than 1 hour in any shift.

The notification must provide: employer name and contact information; address/location of the planned work; starting and ending dates; number of workers; type of structure; amount of lead-containing material to be disturbed; description of the work and work practices to be used; supervisor name; and amount of lead in the disturbed materials (if known).

A non-mandatory form for performing notification is available on Cal/OSHA's website at www.dir.ca.gov/DOSH/dosh1.html. It may be filled out online and emailed to DOSHLeadNotice@dir.ca.gov. The information may also be mailed or faxed to the nearest Cal/OSHA district office.

If unforeseen lead work is initiated on an urgent basis, the notification may be performed by phone followed by written notification within 24 hours.

Table 1: Respiratory Protection for Lead Aerosols

	Airborne Lead Concentration	Required Respirator
Lowest exposure trigger tasks, or	Not > 500 µg/m^3 (up to 10 x PEL).....	half-mask air purifying with high efficiency (P-100) filters or half-mask supplied air in negative pressure mode
	Not > 1,250 µg/m^3 (up to 25 x PEL).....	loose-fitting or helmet PAPR* with high efficiency (P-100) filters, or Type C hood supplied air respirator in continuous-supply mode (for Type CE abrasive blasting respirator in continuous-flow mode see below)
Medium exposure trigger tasks, or	Not > 2,500 µg/m^3 (up to 50 x PEL).....	Full facepiece air purifying with high efficiency (P-100) filters, or tight-fitting PAPR* with P-100 filters, or full facepiece supplied air in demand mode, or half-mask supplied air in continuous-flow mode, or SCBA** in demand mode
Highest exposure trigger tasks, or	Not > 50,000 µg/m^3 (up to 1,000 x PEL).....	half-mask supplied air in positive-pressure mode, or Type CE hood or helmet abrasive blasting respirator operated in continuous-flow mode (with neck cuff or neck sealing feature).
	Not > 100,000 µg/m^3 (up to 2,000 x PEL).....	full facepiece supplied air in positive-pressure mode (e.g., type CE abrasive blasting respirator in positive-pressure mode)
	> 100,000 µg/m^3(>2,000 x PEL)	full facepiece SCBA in positive-pressure mode

Glossary of Symbols, Units of Measure, and Abbreviations

> - symbol meaning "greater than"

x - symbol meaning "times," as in 50 x PEL (50 times the PEL).

ppm - parts per million - The units used to specify the concentration of lead in a material such as a paint chip sample. 1% is equivalent to 10,000 ppm.

µg/dl - micrograms per deciliter - The units used to specify the amount of lead in a person's blood sample, i.e., the weight of lead in a deciliter of whole blood.

µg/m^3 - micrograms per cubic meter - The units used to specify the concentration of lead dust or fume in air. These units are used to express the results of personal air monitoring.

AL - Action Level - A concentration of lead in air of 30 µg / m^3 averaged over an 8-hour shift.

BLL - blood lead level - A measurement of how much lead is in a person's blood.

HEPA - high efficiency particulate air - A type of filter that efficiently captures very small particles and is used in respirators, vacuums, and ventilation systems for toxic dusts such as lead.

*__PAPR__ - powered air-purifying respirator - A respirator equipped with a battery-powered blower which draws air through filters and into the facepiece.

PEL - Permissible Exposure Limit - A concentration of lead in air of 50 µg / m^3 averaged over an 8-hour shift.

**__SCBA__ - self-contained breathing apparatus – Respirator with clean air tank worn on the wearer's back.

ZPP - zinc protoporphyrin - A blood test that can indicate an effect of lead on the blood-forming system. This test is required whenever a BLL is done, and is analyzed from the same blood sample.