



Best Practices for Lead Abatement in Construction

Scope

OSHA's Lead Standard for the Construction Industry, 29 CFR 1926.62, covers lead in a variety of forms, including metallic lead, all inorganic lead compounds, and organic lead soaps.

Construction work is defined as work for construction, demolition, alteration and/or repair, including painting and decorating. The reader must be thoroughly familiar with this regulation and the specific risks at their facility. Although this best practice provides commentary on certain aspects of the regulation, it is not intended to be used in lieu of the regulation.

Key Points

- The Lead Standard for the Construction Industry has significantly more stringent requirements than the standards for residential lead safety as defined by Housing and Urban Development and by EPA's Renovation, Repair, and Painting regulations.
- While use of an x-ray fluorescence device is useful, a "non-detect" reading does not mean lead free, per OSHA.

Hazards of Lead

Lead is most commonly absorbed into the body by inhalation. When workers breathe in lead as a dust, fume, or mist, their lungs and upper respiratory tract absorb it into the body. They can also absorb lead through the digestive system if it enters the mouth and is ingested.

A significant portion of the lead inhaled or ingested gets into the bloodstream. Once in the bloodstream, lead circulates through the body and is stored in various organs and body tissues. Some of this lead is filtered out of the body quickly and excreted, but some remains in the blood and tissues. As exposure continues, the amount stored will increase if the body absorbs more lead than it excretes. The lead stored in the tissue can slowly cause irreversible damage, first to individual cells, then to organs and whole-body systems.

Major Elements of OSHA's Lead Standard for Construction

OSHA's lead in construction standard applies to all construction work where an employee may be exposed to lead. All work related to construction, alteration, or repair, including painting and decorating, is included. Under this standard, construction includes, but is not limited to:

- Demolition or salvage of structures where lead or materials containing lead are present;
- Removal or encapsulation of materials containing lead;
- New construction, alteration, repair, or renovation of structures, substrates, or portions or materials containing lead;
- Installation of products containing lead;
- Lead contamination from emergency cleanup;
- Transportation, disposal, storage, or containment of lead or materials containing lead where construction activities are performed; and



- Maintenance operations associated with these construction activities.

The major elements of the Lead Standard for construction include:

- A permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air, as averaged over an 8-hour period.
- Requirements that employers use engineering controls and work practices, where feasible, to reduce worker exposure.
- Requirements that employees observe good personal hygiene practices, such as washing hands before eating and taking a shower before leaving the worksite.
- Requirements that employees be provided with protective clothing and, where necessary, with respiratory protection accordance with 29 CFR 1910.134. See also the Best Practice for Respiratory Protection.

Define the Risk

The person in charge of the work must ensure that all unknown coatings or materials are evaluated for the presence of lead prior to the commencement of work which may result in employee exposures to lead. The employer has three choices:

- Employee exposure assessment (airborne exposure monitoring),
- Use of historical data for similar tasks under similar conditions, or
- Objective data that there is no lead exposure hazard. Per the regulation, objective data is that which “can be obtained from an industry-wide study or from laboratory product test results from manufacturers of lead containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.”

A Caveat on the Use of X-Ray Fluorescence (XRF) Analyzers

Use of a handheld x-ray fluorescence analyzer for field lead analysis can be useful, but it's important to note that a “non-detect” indication does not mean that no lead is present and there are [Letters of Interpretation](#) that say that there is no minimum amount of lead in paint to avoid using one of the three methods indicated above. To quote from one Letter of Interpretation from 2000, “OSHA does not consider any method that relies solely on the analysis of bulk materials or surface content of lead (or other toxic material) to be acceptable for safely predicting employee exposure to airborne contaminants. Without air monitoring results or without the benefit of historical or objective data (including air sampling which clearly demonstrates that the employee cannot be exposed above the action level during any process, operation, or activity) the analysis of bulk or surface samples cannot be used to determine employee airborne exposure.” This limitation is because personal exposure exceedances have been documented when lead concentrations are below the 0.1 mg/cm² (detection limit) value.



In other words, the detection limit of the XRF unit is not low enough to ensure acceptable levels of occupational exposure.

Lead paint sampling, including via an XRF analyzer, can be helpful in determining whether an initial exposure assessment is necessary. It can also be helpful in dictating the conditions under which the initial exposure assessment will be performed and how a contractor may go about dealing with the potential hazard. For instance, if extremely high concentrations of lead are detected, OSHA would require workers to wear a full-face or supplied-air respirator during the initial industrial hygiene exposure assessment. It also may be of assistance in determine whether certain surfaces should be abated by a remediation company prior to starting work.

Controls

Certain lead-related construction tasks commonly produce exposures above the PEL and often orders of magnitude above the PEL. The OSHA lead standard for construction is unique in that it groups tasks that are presumed to be associated with employee exposures above the PEL ($50 \mu\text{g}/\text{m}^3$) into three lead-exposure ranges. The exposure ranges assigned to the different categories of tasks are based on data collected by OSHA and other sources including two advisory groups.

Lead-related Construction Tasks and Their Presumed 8-hour TWA Exposure Levels

> 50 to 500 $\mu\text{g}/\text{m}^3$

- Manual demolition
- Dry manual scraping
- Dry manual sanding
- Heat gun use
- Power tool cleaning with dust collection systems
- Spray painting with lead paint

> 500 $\mu\text{g}/\text{m}^3$ to 2,500 $\mu\text{g}/\text{m}^3$

- Using lead-containing mortar
- Lead burning
- Rivet busting
- Power tool cleaning without dust collection systems
- Cleanup of dry expendable abrasive blasting jobs
- Abrasive blasting enclosure movement and removal

> 2,500 $\mu\text{g}/\text{m}^3$

- Abrasive blasting
- Welding
- Torch cutting
- Torch burning

Until an employer performs an employee-exposure assessment and determines the magnitude



of the exposures actually occurring during the lead-related activity, the employer must assume that employees performing that task are exposed to the lead concentrations indicated above and in [Appendix V:3-1](#) of OSHA Technical Manual, Section V: Chapter 3, [Controlling Lead Exposures in the Construction Industry: Engineering and Work Practice Controls](#). For all three groups of tasks, employers are required to provide respiratory protection appropriate to the task's presumed exposure level, protective work clothing and equipment, change areas, hand-washing facilities, training, and the initial medical surveillance prescribed by the standard. The only difference in the provisions applying to the three categories of tasks is the degree of respiratory protection required.

Engineering and Work Practice Controls

Engineering Controls

Engineering controls, such as ventilation, and good work practices are the preferred methods of minimizing exposures to airborne lead at the worksite. The engineering control methods that can be used to reduce or eliminate lead exposures can be grouped into three main categories: (1) substitution; (2) isolation; and (3) ventilation. Engineering controls are the first line of defense in protecting workers from hazardous exposures.

Work Practice Controls

Work practices involve the way a task is performed. OSHA has found that appropriate work practices can be a vital aid in lowering worker exposures to hazardous substances and in achieving compliance with the PEL. Some fundamental and easily implemented work practices are: (1) good housekeeping, (2) use of appropriate personal hygiene practices, (3) periodic inspection and maintenance of process and control equipment, (4) use of proper procedures to perform a task, (5) provision of supervision to ensure that the proper procedures are followed, and (6) use of administrative controls (e.g., scheduling of the work or workers).

Lead Abatement Operations

The document, OSHA Technical Manual, Section V: Chapter 3, [Controlling Lead Exposures in the Construction Industry: Engineering and Work Practice Controls](#) covers many types of lead abatement operations with recommended best practices included for each.

Disposal of Lead Based Paint

Wastes from non-residential renovations may be subject to RCRA hazardous waste requirements. State regulations may be more stringent than the Federal RCRA rule. Per RCRA, waste lead-based paints are hazardous waste if the concentration of lead is greater than 5 mg/l. Small-scale debris that is generated during renovation, maintenance, or abatement activities such as paint chips, vacuum debris and dust, waste wash water and sludge from chemical paint stripping are hazardous waste if the TCLP test is greater than 5 mg/l. Items painted with lead-based paint are unlikely to exceed the TCLP test.



Training

Per the regulation, for employees who are subject to lead exposure at or above the action level, perform initial training, recurring training at least annually, and when job positions or conditions change.

Other Resources

Lead in Construction, [OSHA 3142-12R 2004](#)

OSHA Technical Manual, Section V: Chapter 3, [Controlling Lead Exposures in the Construction Industry: Engineering and Work Practice Controls](#)

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