



National Institutes  
of Health



# LEAD: WORKER AND EMPLOYER GUIDE TO HAZARDS AND RECOMMENDED CONTROLS



## WHAT IS LEAD?

Lead is a soft, blue-gray metal that occurs naturally in the Earth's crust. Because of its very useful properties, lead was one of the first metals used by humans, and, consequently, the cause of the first recorded occupational disease. In the past, lead was used regularly in paint, batteries, ceramics, caulk, pipes, and solder for pipes.

## WHAT ARE THE HAZARDS OF LEAD?

Lead overexposure is one of the leading causes of workplace illness. In adults, lead enters the body primarily through breathing in lead-containing dust, along with accidental ingestion (e.g., eating, drinking, smoking). Lead passes from the lungs or the digestive tract into the blood where it can harm many of the body's systems. Workers exposed to lead on the job may develop a variety of health problems, such as nervous system, digestive tract, blood, kidney, heart, and brain damage. Poor personal hygiene practices, such as workers handling items contaminated with lead or lead-containing dust and then touching their eyes, nose, or mouth before washing their hands can lead to exposure. When lead in the air or lead on contaminated surfaces comes into contact with clothes, hair and/or skin, workers can unknowingly bring lead home and expose family members.

**Workers exposed to lead on the job may develop a variety of health problems, such as nervous system, digestive tract, blood, kidney, heart, brain, and reproductive system damage in both men and women.**

The Occupational Safety and Health Administration (OSHA) has requirements to protect workers from the hazards of lead, and the National Institute for Occupational Safety and Health (NIOSH) has recommendations to protect workers from the hazards of lead. The Department of Housing and Urban Development (HUD) and

the Environmental Protection Agency (EPA) also have requirements and guidelines pertaining to lead hazards in housing. We strongly recommend using a certified lead-safe contractor or a certified lead abatement contractor to perform any work involving lead or lead-based paint in homes built before 1978.

## WHERE IS LEAD FOUND IN HOMES AND RESIDENTIAL BUILDINGS?

Lead dust is produced when lead metal is cut or when lead-based paint is cut, sanded, chipped, scraped, or crushed. Workers may be exposed to lead during the removal, renovation, or demolition of structures painted with lead-based paints. Workers also may be exposed during installation, maintenance, or demolition of lead pipes and fittings, lead linings in tanks, and other work involving lead metal. Lead paint was not banned from use in residential paint until 1978; therefore, homes painted prior to 1978 have the potential to contain lead-based paint. The older a home or a building is, the more likely it has some lead-based paint.

## PROTECTING WORKERS

Employers are required to protect workers from lead exposure under OSHA lead standards covering general industry ([29 CFR 1910.1025](#)) and construction ([29 CFR 1926.62](#)). The lead standards establish a Permissible Exposure Limit (PEL) of 50 micrograms of lead per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) sampled over an eight-hour time-weighted average for all workers covered. These standards also include an action level of  $30 \mu\text{g}/\text{m}^3$ , where the employer must implement specific compliance activities.

Worker protection involves engineering controls, work practices and personal protective equipment (PPE). Engineering controls include isolating the exposure source and/or using other engineering methods, such as general room or local exhaust ventilation on power tools such as sanders, grinders, and saws, to minimize exposure to lead. When lead exposures are above the PEL, employers are required to provide, at no cost to the workers, protective clothing and equipment as well as cleaning, laundering, or disposal of that protective clothing and equipment.



## METHODS TO PREVENT OR REDUCE WORKER LEAD EXPOSURE

- Per OSHA lead standards, employers must conduct an exposure assessment to initially determine if any worker may be exposed to lead at or above the action level.
  - Leave lead where it is. For example, it may be safer to seal old lead-containing paint underneath new, non-lead-containing paint.
  - Remove and replace items with lead-containing paint rather than trying to chip, sand, or otherwise remove the paint.
- Wet surfaces (e.g. painted surfaces) before and during work (e.g., scraping, sanding) that might create lead-containing dust to help prevent workers from inhaling or ingesting lead (this reduces but does not completely prevent exposures).
  - Ensure work areas are well ventilated. This may be accomplished simply by opening doors and windows when working inside a closed structure. Local ventilation equipment may also be needed.
  - Avoid dry and wet sweeping, shoveling or brushing dust that may contain lead. Only use a vacuum that is equipped with a high efficiency particulate air (HEPA) filter for cleanup activities
  - Conduct air monitoring to ensure workers are not exposed above the OSHA PEL. Take appropriate actions if worker exposures exceed the action level ( $30 \mu\text{g}/\text{m}^3$ ) for more than 30 days per year.
  - Provide workers with appropriate PPE, including fit-tested, NIOSH-approved respirators, and ensure workers clean contaminated PPE after each use. The use of respirators requires compliance with the OSHA respiratory protection standard ([29 CFR 1910.134](#)).
  - Wear outer clothing that can be disposed of or washed (separately) after completing work.
  - Provide training for workers on the hazards of lead and how they can protect themselves before being exposed.
  - Ensure that food or beverages are not present or consumed, tobacco products are not present or used, and cosmetics are not applied in areas where workers may be exposed to lead.
  - Ensure that workers wash their hands and face prior to eating, drinking or applying cosmetics.
  - Inform medical professionals of work activities involving lead or potential lead exposure.

## METHODS TO PREVENT TAKING LEAD HOME FROM WORK

- Wash hands and face often and shower at the end of the work shift.
- Change out of work clothes and shoes before going home. Always wear clean, uncontaminated clothing and shoes home.
- Do not take contaminated work clothing or shoes home. If necessary, put contaminated clothing/shoes in a plastic bag or other closable container. Do NOT wash contaminated work clothes with personal clothing.

## DECONTAMINATION

Hand washing with standard soap and water is recommended by OSHA and NIOSH. However, specialized lead removal products should also be considered by employers, particularly if dust or paint is found to have high lead concentrations. Products are available that reveal lead contamination on hands/surfaces, and that remove lead residues from skin.

Employers must provide workers with a way to discard disposable work clothing or store contaminated clothing in a closable container that will prevent lead dust from getting outside of the container. If work clothing is heavily contaminated with lead-containing dust, a vacuum equipped with a HEPA filter can be used to vacuum workers' clothes before removal to prevent dust being shaken off during removal of clothing. Respirators must not be removed until entering a clean area. Respirators must also be cleaned after every use. If workers may be exposed to higher levels of lead, shower facilities and a change-out room that has a separate storage for clean street clothes and soiled work clothing must be made available. There are products available to prevent lead dust from being tracked through clean areas, like sticky mats that remove dust and dirt from the bottom of workers' shoes.

## OTHER SAFETY AND HEALTH HAZARDS

Recovery workers involved in demolition and rebuilding may face additional hazards on the job site. Common hazards include downed electrical wires, carbon monoxide and electrical hazards from portable generators, fall and "struck-by" hazards from tree limbs or working at heights, working in unprotected excavations or confined spaces, burns, lacerations, musculoskeletal injuries, being struck by traffic or heavy equipment, and encountering contaminated water during cleanup and recovery efforts.

## ADDITIONAL RESOURCES

- Occupational Safety and Health Administration (OSHA) Safety and Health Topics page on Lead: <http://www.osha.gov/SLTC/lead/>
- National Institute for Occupational Safety and Health (NIOSH) Workplace Safety and Health Topics page on Lead: <http://www.cdc.gov/niosh/topics/lead/>
- National Institute for Occupational Safety and Health (NIOSH) "Protecting Workers Exposed to Lead-Based Paint Hazards: A Report to Congress". Publication No. 98-112 (January 1997) at: [www.cdc.gov/niosh/docs/98-112/](http://www.cdc.gov/niosh/docs/98-112/)
- Environmental Protection Agency (EPA) Lead Renovation, Repair and Painting Program: <http://www2.epa.gov/lead/renovation-repair-and-painting-program>
- OSHA's lead standard for general industry (29 CFR 1910.1025) at: [https://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10030](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10030)
- OSHA's lead standard for construction (29 CFR 1926.62) at: [http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10641](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10641)

## ASSISTANCE FOR EMPLOYERS

OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-6742 (OSHA) or visit <http://www.osha.gov/dcsp/smallbusiness/index.html>.

**This guidance document creates no new legal obligations. It contains recommendations as well as descriptions of OSHA safety and health standards. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available by the OSHA Office of Communications to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.**