

Protecting Workers from Lead Hazards at Indoor Firing Ranges

Using lead bullets or lead-containing primers at indoor firing (shooting) ranges can expose workers to lead and result in unsafe levels of lead in their blood. Lead enters the body through inhalation or ingestion. Once in the bloodstream, lead can damage various organs and cause health problems.

Firing range employers must protect their workers from the hazards of lead exposure. The Occupational Safety and Health Administration (OSHA) [Lead Standard](#) (29 CFR 1910.1025) requires that in a workplace with potential lead exposure, the employer conduct an initial determination of workers airborne exposure to lead. If a worker is exposed at or above the action level (AL) or above the permissible exposure limit (PEL) for lead, additional requirements apply. This fact sheet provides firing range employers with information on how their workers can be exposed to lead and summarizes the provisions and requirements of the Lead Standard that apply to firing ranges. For more complete information on lead and detailed requirements under the Lead Standard, visit OSHA's [Safety and Health Topics Page on Lead](#).

How lead exposure can occur:

- Shooting firearms with lead bullets or lead-containing primer creates airborne lead in the gun smoke.
- Lead bullet deformation and fragmentation can cause lead exposure at hard surface bullet trap systems.
- A building's standard HVAC system may not adequately remove airborne lead particles from the range.
- Handling spent cartridges or cleaning firearms can contaminate the hands and skin with lead.
- Improper range cleaning methods (dry sweeping; compressed air; non-high-efficiency particulate air (HEPA) filtered vacuums) or inadequate cleaning of lead-contaminated surfaces.
- Recovering lead bullets from traps, emptying bullet trays, or casting lead bullets can create lead dust and fumes.
- Bringing and consuming food and drinks in the range area. Not washing hands and face before eating, drinking, or smoking.
- Lack of handwashing facilities for workers to remove lead.
- Wearing contaminated work clothes in eating and office areas or wearing these clothes home.



Photo: NIOSH

NIOSH estimates there are 16,000 to 18,000 indoor firing ranges in the U.S.

Firing Ranges and the OSHA Lead Standard

The following section highlights selected OSHA requirements, along with recommendations, that can help employers both comply with the Lead Standard and implement best practices. For all employer requirements under the standard, see OSHA's [Lead Standard](#) (29 CFR 1910.1025).

Exposure Monitoring

Required

- An initial determination – Collect full-shift personal air samples to determine if employee exposure is at or above the AL of 30 µg/m³ or exceeds the PEL of 50 µg/m³.
- If employee exposure is at or above the AL >30 days a year, employers must offer medical surveillance, including blood lead level monitoring to affected employees.
- Repeat monitoring is required at various intervals if exposures are at or above the AL or above the PEL. *See* 29 CFR 1910.1025(d)(6).
- If exposure is above the PEL >30 days a year, then employers must implement engineering and work practice controls to reduce exposure to or below the PEL (see box below for recommended exposure controls for firing ranges).
- When ventilation is used to control exposure, ensure effective operation of the ventilation system with scheduled (every 3 months) inspections and routine maintenance.

RECOMMENDED EXPOSURE CONTROLS FOR FIRING RANGES

Eliminate/Substitute: Use jacketed or lead-free bullets and non-lead primer.

Engineering Controls: Provide a separate “push/pull” ventilation system (not connected to the general HVAC system) with supplied and exhausted air flow designed to move lead emissions downrange from the source (firearm) toward the filtered exhaust area at/or behind the bullet trap:

- Electrically interlock supply and exhaust fans for simultaneous operation when the range is in use.
- Use HEPA filters in the ventilation exhaust system to prevent lead from entering the outside environment.

Work Practice Controls: Use a closed bag system to empty bullet trays and debris. Use a water mist spray or other type of wet method to keep lead dust from becoming airborne.

Housekeeping

Required

- Keep all surfaces as free of lead accumulations as practical.
- Ensure that workers do not use compressed air to clean floors or other surfaces where lead may accumulate.
- Ensure that workers do not shovel, dry-sweep, or brush lead-bullet debris unless vacuuming or other equally effective methods have been tried and found not to eliminate the hazard. *See* 29 CFR 1910.1025(h)(2)(ii).

Recommended

- Use a HEPA filtered vacuum and/or wet methods for cleaning.
- Perform housekeeping and cleaning procedures on a frequent basis.
- Wipe sample detection of lead is a useful tool to evaluate a housekeeping program (surfaces and floors including eating areas) and hygiene practices (employee hands) by identifying lead contamination. Colorimetric wipes for on-the-spot detection of lead are now readily available.

Respiratory Protection

Required

- Provide appropriate, NIOSH-approved respirators when engineering and work practice controls are not sufficient to reduce lead exposure to or below the PEL.
- For more information on respiratory protection program requirements, including fit testing, see OSHA’s [Respiratory Protection standard](#) (29 CFR 1910.134) and visit OSHA’s [Safety and Health Topics webpage on Respiratory Protection](#).

Recommended

- Even when exposure is below the PEL, provide workers with appropriate respiratory protection for short-term, high lead exposure work tasks such as cleaning bullet traps, changing ventilation system filters, or disposing of vacuum-collected dust.

Protective Work Clothing and Equipment

Required

- Provide full-body work clothing (coveralls or disposable suits), gloves, head and foot covering, face shield, and vented goggles to workers exposed to lead above the PEL.

- Ensure that workers do not use compressed air or similar methods to remove lead dust from range floors, other surfaces, or clothing.

Recommended

- Provide protective work clothing and equipment for employees while performing range cleaning or maintenance.

Hygiene Facilities and Practices

Required

- Prohibit food, drink, eating, tobacco, and the use of cosmetics in areas with lead exposure above the PEL.
- Change rooms, separate storage lockers, and showers must be provided when worker exposures to lead are above the PEL.

Recommended

- Provide readily available handwashing stations.
- Do not allow any food, drinks, or tobacco products in the range area.
- Consider using lead decontamination wipes in addition to soap and water to remove lead from hands after cleaning firearms and picking up spent casings and before eating, drinking, or smoking.
- Provide a clean change area and separate storage lockers for employees with lead hazards in their work area, regardless of exposure levels.

Medical Surveillance and Medical Removal Protection

Required

- Implement a medical surveillance program for workers exposed to lead at or above the AL >30 days a year.
- Make available blood lead and zinc protoporphyrin testing to workers exposed to lead at or above the AL at frequencies specified in the Lead Standard. *See* 29 CFR 1910.1025(j)(2).
- Remove employees from work who have a lead exposure at or above the AL if their blood lead level meets or exceeds the criteria specified in the Lead Standard, or if a physician determines removal is needed. *See* 29 CFR 1910.1025(k)(1).

Recommended

- Offer blood lead testing for employees with lead hazards in their work area, regardless of exposure levels.

- Blood lead levels at or above 5 micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$) are considered elevated.

Employee Lead Hazard Training and Hazard Communication

Required

- Inform workers with potential lead exposure of the content of Appendices A and B of the Lead Standard.
- Provide initial and annual training to all employees exposed to lead at or above the AL on the content of the Lead Standard and work activities that could result in lead exposure.
- Post warning signs with the language specified in the Lead Standard in each work area where the PEL is exceeded.
- OSHA's [Hazard Communication standard](#) (29 CFR 1910.1200) requires employers to provide information and training for all employees with lead hazards in their work areas.

Additional Information

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories 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. To locate the OSHA On-Site Consultation Program nearest you, visit www.osha.gov/consultation.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.

- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page (www.osha.gov/workers).

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. 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 to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.



U.S. Department of Labor

