FIRING RANGES

The Airborne Lead Dust Hazard

Employer's Guide

Texas Department of Health

THE AIRBORNE LEAD DUST HAZARD

Exposure to lead dust and fumes at the firing range may harm the health of:

- Firearm instructors
- Other employees
- Shooters

The firing range safety plan should:

- Protect their health and
- Minimize contamination to the environment

LEAD DUST IN A FIRING RANGE

Airborne lead dust is created by:

- Exploding lead styphnate primers
- Friction from the lead slug against the gun barrel
- Lead slugs hitting the bullet trap, walls, floors, or ceiling of the range
- Spent bullets and settled dust
- Improper range-cleaning methods disturbing settled dust
- Poor indoor range ventilation
- Outdoor weather conditions

Other High Lead Dust Sources

Bullet loading creates a fine dust that is very difficult to clean.

Melting lead to cast bullets produces a fume, which turns into tiny dust particles that can stay in the air for up to 10 hours. A person can easily breathe in this fine dust.

The dust also can contaminate surfaces.

NEVER load bullets or melt lead:

- In an unventilated area
- Inside the home
- Anywhere children may live or play

Lead Dust Can Be Carried Home!

When employees and shooters are in the firing range, lead dust can:

Settle on their bodies
Settle on their hair
Settle on their clothes
Be picked up on their shoes

Then the dust can be carried to their cars and homes, where it can harm their family and children.

HEALTH EFFECTS

Lead is a strong poison that serves no known use once absorbed by the body. Lead dust can enter the body by breathing or eating.

The body stores lead in the:

BLOOD - for about 1 month
BODY ORGANS - for several months
BONES - for decades

It affects the:

Brain and nervous system
Digestive system
Reproductive system
Kidneys
Ability to make blood

Small amounts of lead can build up in the body and may cause temporary symptoms or permanent damage.

To find the amount of lead in the body, a health professional can take a blood sample from an adult or child and have it analyzed.

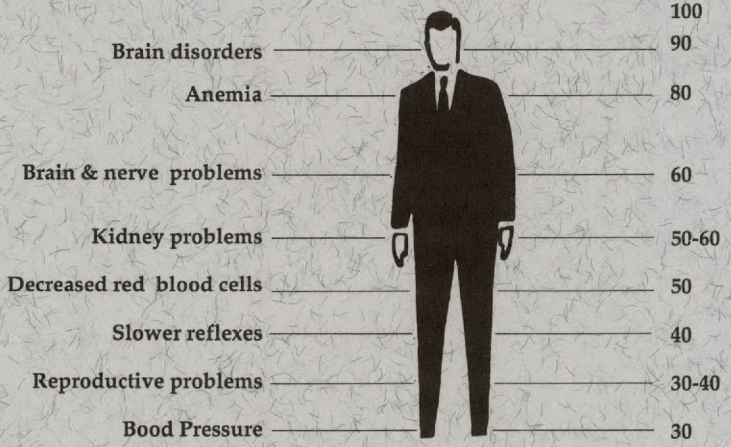
An elevated blood lead level is a sign that lead is building up in the body faster than it can be removed.

Adults

Adults can absorb lead at work or from hobbies. Lead dust and fumes can enter the body by:

- Breathing in lead dust and fumes
- Swallowing lead when drinking, eating, or smoking in contaminated areas
- Not washing their hands and faces after being in a contaminated area

Health Effects in Adults



Health effects begin at approximately these levels, but not everyone experiences them.

WHAT AN EMPLOYER SHOULD DO

INDOOR RANGES

LIMIT EXPOSURE

The Occupational Safety and Health Administration (OSHA) limit for lead exposure for an employee is:

In Air: Do not exceed the PEL (Permissible Exposure Limit) of 50 micrograms of lead per cubic meter of air averaged over an 8-hour day.

In Blood: Levels should be below 40 micrograms per deciliter of blood for a firing range employee working 40 hours a week.

ISOLATE

Instructors are at greatest risk for long-term exposure to lead because they spend more time on the firing range.

A separate booth for the instructor can be installed in the range.

It must have its own tempered and filtered air supply.

It will not reduce lead exposures to other range users, but, it will reduce the range instructor's lead exposure.

SUBSTITUTE

Substitution may reduce lead exposure so no additional range alterations are necessary.

To reduce the airborne lead discharged in firing use:

- Copper bullets or
- Nylon-clad bullets and
- Non-lead primers
  (such as mannitol hexanitrate tetracene)

The ballistic characteristics of non-lead primers do not equal those of conventional primers.

When conventional primers are necessary, use this ammunition loaded with jacketed bullets.

BULLET TRAP

Avoid using angled backstops with sand traps.

Sand traps can generate a large amount of airborne lead dust and require frequent cleaning.

Escalator backstops and their variations:

- Trap bullets and fragments
- Generate less dust and are easier to clean
- Spent bullets can be recovered and sold without sand removal

VENTILATION

- Design ventilation systems for planned use of firing range.
- Ventilation system for range area must be separate from ventilation for rest of building.
- Exhaust air from range should not feed into air supplies for:
  - Offices
  - Meeting rooms
  - Other businesses
- Improper use or maintenance of ventilation system can defeat its purpose and increase lead contamination.
- Effective ventilation system - produces smooth airflow.
- Ineffective ventilation system - produces eddies and recirculation that can carry fumes and dusts from weapons to the area behind the firing line.
- Recirculation and channeling airflow can be caused by objects such as:
  - **Overhead barriers**
  - **Sound barriers**
  - **Booth walls**
  - **Light fixtures**
  - **Poorly located air inlets**
  - **Shooters**

CLEANING

- Indoor firing ranges require frequent cleaning.
- Clean walls, floors, ceilings, and bullet traps on a regular basis to:
  - Prevent settled dust from becoming an airborne hazard and
  - Make ventilation system work better.
- Use appropriate methods to clean.
  - DO NOT DRY SWEEP!
  - Use vacuum cleaner with a high-efficiency particulate (HEPA) filter to remove lead-contaminated dust.
  - Use a wet cleaning method if vacuum cleaner with a HEPA filter is not available.
  - Employees cleaning range must:
    - Wear appropriate protective equipment
    - Wear an approved respirator
    - Wear work clothing
    - Wear work shoes
    - Shower and change clothes before leaving site
  - Work clothing must be disposable or laundered separately to prevent contaminating the home.

OUTDOOR RANGES

Airborne lead dust is also a concern in outdoor ranges.

Employees or shooters can be exposed to lead dust.

The surrounding environment can become contaminated by wind carrying the lead dust off-site and through water runoff.

BULLET TRAP

Removing spent bullets or removing the face of a berm can create large quantities of lead dust.

Instead of earthen backstops, steel backstops similar to those constructed in indoor ranges, can be used.

- The trap holds the bullets and fragments, minimizing lead pollution in the soil.
- The spent bullets can be recovered and sold without soil removal.

REFERENCES

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Juhasz AA, The Reduction of Airborne Lead in Indoor Firing Ranges by Using Modified Ammunition, US Department of Commerce, 1977.

ATSDR Toxicological Profiles, 1990.

OSHA, Occupational Lead Standard, 29 CFR 1910.1025.

WHAT EMPLOYEES AND SHOOTERS CAN DO

Use the ventilation systems.
Make sure they are working properly.

Wash hands and face before eating - drinking - smoking.

Wash hands and face before leaving range.

Wash range clothes separately from family's clothes.

Always load bullets in a ventilated area.

Do not load bullets in the home or in areas where children live or play.

Do not allow children into the bullet-loading area.

Keep bullet-loading area clean by using a high-phosphate detergent.

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For more information on lead exposure and firing ranges write or call:

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