

Targeting

Getting the Lead Out

Reduction Assistance Manual For Indoor Gun Ranges

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Lead Waste



Why should lead emissions be a concern?

Lead is a metal that is commonly used in bullets, batteries, fishing and diving weights, older metal toys, ceramic glazes, and for years it was an additive to gasoline. So why should you be concerned about your lead wastes? Lead is extremely toxic! Unlike other metals such as copper, iron and zinc, which are used in small amounts by the human body for various metabolic processes, lead is not used in any way by the human body. The natural level of lead in the human body is zero. Lead can enter the human body by inhalation, ingestion, and to a lesser extent, absorption through the skin.

Indoor ranges almost always require their customers to use ear & eye protection, but exposure to lead dusts and fumes may not always be considered a serious threat. Exposure to lead over a period of time will affect human health. Exposure can occur during firing, weapon cleaning, house keeping and lead reclamation operations. Low levels of lead can affect the body in a manner that is not readily apparent and may produce symptoms of many other diseases, which may result in misdiagnosis. Lead adversely affects every organ of the body. Severe cases may result in seizures, kidney disease, paralysis, coma, and even death. Symptoms can include:

- headache
- fatigue
- bleeding gums
- Insomnia
- Weight loss
- Joint pains
- Elevated blood pressure
- neurological symptoms (i.e. twitching)
- abdominal pains



Children are at high-risk for lead poisoning. Exposure to low levels of lead can adversely affect the development of a child's brain, nervous system, and bones. In addition, lead can be absorbed and stored in bones during development.

OSHA considers 40 micrograms per deciliter (ug/dl) as elevated levels in adults and 10 ug/dl in children, but detrimental effects may be detectable before these levels are reached. Additionally, it is important to realize that a lead level that produces symptoms in one individual could be life threatening or lethal to another.

Ventilation

Proper ventilation can reduce customer and employee exposure to lead. A properly functioning system can reduce lead emissions into the outside air and surrounding areas. There are a number of different types of ventilation systems to choose from. Consult with ventilation equipment companies and range designers to identify what type of system will work best in your range. Whatever system you decide to use, remember to operate it properly and keep it well maintained ventilation and filtration systems, when properly installed and maintained, can provide dollar savings as well as help meet regulatory standards.

- High Efficiency Particulate filters (HEPA) with 99%-filtering capabilities of dust at 0.5 microns is available. Installing pre-filters can help to reduce the frequency of HEPA filter changes and reduce overall operating costs.
- Recirculate indoor air through the filter system. Indoor air re-circulation & filtration can realize significant energy savings during heating or cooling cycles.
- HEPA filters should be used to filter air before exhausting it outdoors.
- Install an automatic range shutdown device that would curtail range activity if any segment of the filtration system would fail.
- Airflow across shooting positions can help prevent airborne contaminants from being blown back on shooters. Range designers can identify the level of airflow your range will need to prevent dust blowback.
- A separate ventilation system for the firing range will help prevent the circulation of contaminated air to other parts of the building.
- Conduct routine preventative maintenance of the filter system.

House-keeping and Maintenance

Ranges need routine maintenance and housekeeping to continue operating properly. The following are a few suggestions to improve the overall condition of your range:

- Establish a program for routine repair and maintenance work to keep the range at peak operational efficiency and to reduce hazardous conditions.
- Avoid lead smelting in unvented or unfiltered areas.
- The ventilation system is an important part of your range. It should always be operating while the range is used and during cleanup.
- Avoid hand sweeping. Sweeping causes dust to become airborne. Cleanup with a vacuum (preferably equipped with a HEPA filter) or by wet method. Wipe with a tri-sodium phosphate and water mixture. If wet method is used, reclaim lead from wastewater before discharge to the sanitary sewer system.
- Seal or coat range floors with an impermeable smooth surface to facilitate cleaning (i.e. Polyurethane).

Pollution Prevention Options

- Set up an education and training program on range use, safety, and maintenance.
- Ranges are a source of lead material for recyclers. Recycle primers, cases, and lead materials.
- Consider using gunpowder that is smokeless and non-toxic.
- Set up or continue a program to monitor employee blood lead levels to identify at-risk employees.
- Measure on-site lead in air before and after waste reduction efforts are implemented to monitor your reduction success.
- To reduce employee exposure, consider job rotation or reduction in the duration of each job.
- Lead-free technology is available. Initial purchase costs per cartridge may be slightly higher, but considering health, ventilation equipment, disposal, and maintenance expenses that result from lead use, lead free or reduced lead bullets offer a lower total cost. Consider supplying lead-free/reduced lead ammunition and require its use on your range. Copper or brass-jacketed bullets are available and new trap technology may reduce environmental effects. Primers are available that are clean firing products designed to virtually eliminate airborne contaminants at the firing point. Remember prevention is the key.

Wastes Associated with Indoor Gun Ranges

Air toxics and toxic wastes are direct by-products of firing weapons. Human exposure to lead, barium, and antimony can occur at the firing point. Lead dust and fumes are generated from the friction and vaporization of the bullet as it passes through the firearm and from the combustion of lead in the primer.

Additional lead releases occur when bullet fragments strike the bullet stop. Unless outfitted with state-of-the-art air filters, exhaust fans may send lead to the outside air. Improper handling of lead waste could transfer pollutants to the outdoor air, soil, sewer systems, domestic solid waste streams, and to surface & ground waters through surface water runoff.

What Can You Do To Reduce Lead Exposure and Minimize Wastes?

Gun ranges are a necessity for developing proficiency with firearms, but owners and operators need to ensure the safety of their customers and the surrounding environment. Even a well-ventilated range may contain lead dust and gases that tend to settle on the floors and walls. The visible clouds of lead-filled smoke may be inhaled. If you are unsure of your lead exposure, try blowing your nose after an extensive shooting session. The black lead-filled gun smoke is visible in the mucus.

So now that you are aware of your lead waste, what can you do? It is much easier to prevent lead poisoning than to treat it. Take the proper personal precautions during shooting and range cleaning operations:

Waste Reduction Assistance Manual for Indoor Gun Ranges

- Use the proper respirator. Safety and equipment supply businesses can recommend an inexpensive, two-stage respirator rated for metallic particles and vapors. Respirators should be worn while cleaning or making repairs to the gun range and during reclaiming operations.
- If a full respirator is not an option, at least use one of the disposable paper masks rated for capture of fine dust particles.
- Avoid eating, drinking, or smoking at the range. If you are in charge of the range, prohibit such activities.
- Try to wear a jump suit or similar outer garment that can be washed or left in your locker for range use. This can help prevent carrying lead dust into your car and home.
- When you leave the range, blow your nose to expel dust and wash your face and hands with cold soapy water. Cold water closes skin pores and helps prevent absorption through the skin.
- Keep an extra pair of shoes to change into after leaving the range (to prevent transfer to home, car, etc.).
- Wash your hair before bedtime. Your hair can hide small lead dust particles (to prevent re-exposure).
- The most important precaution is to have your blood lead levels checked every six months to assure you that your precautions are adequate.

Case Study in Waste Reduction

A few years ago, an indoor range in Pinellas County, Florida was found to be emitting lead dust to the outside air. In addition, there was a lead smelter located outside of the range building with open containers that stored bullet fragments. A day care center was located nearby. Laboratory tests revealed that contamination of soil and buildings had occurred. Several children from the nearby day care center and neighborhoods were found to have elevated lead levels and a few were diagnosed with lead poisoning. The owner voluntarily closed the range to begin cleanup and remediation of the contamination. This included the removal and disposal of contaminated soil, cleaning of building interior and the installation of an air filter control system. The clean up and remediation was costly. When the owner finally re-opened the range, only the use of lead-free ammunition was permitted.

Fortunately, there are ways for you to avoid a similar disaster. For example, the St. Petersburg Junior College (SPJC) has designed and developed one of the safest indoor gun ranges in Florida.

SPJC operates an indoor firing range on the Allstate Center campus in St. Petersburg, Florida. The range was originally built to train law enforcement officers in the Tampa Bay region and is now open to the general public. SPJC hired an environmental consultant to assist in designing a range that would significantly reduced the lead exposure to customers and employees in a cost effective manner.

The new range fit the bill. With the exception of shotgun training, 85% of the ammunition used on the range is lower in lead than traditional lead bullets. Low lead ammunition may cost twice as much as traditional lead bullets but range maintenance and lead exposure is reduced. Low lead ammunition has reduced the amount of filter changes necessary for the air handler and the bullet jackets are recycled. Cleaning requirements have been cut in

Waste Reduction Assistance Manual for Indoor Gun Ranges

half. A hazardous materials contractor cleans the traps every two weeks and recycles the residual brass and lead waste. In addition, a HEPA filter vacuum is used to collect any residual dust in the firing area.

The major component of the ranges waste reduction program was the installation of an air filtration system. The system was very expensive, but SPJC considered it a wise investment given the system's ability to significantly reduce health hazards associated with lead exposure. Standard airflow of the system is 120 cu. ft./min and two air handlers pull outside air in at a rate of 33,000 cu. ft./min. Air flows from the shooting positions to down range to reduce the customer's exposure to primer dust. Approximately 66-75% of the air is recirculated. Range air moves through a series of four filters before being recirculated or released outdoors. This includes two filters, which remove 65% of the particulate, a HEPA filter, which removes 99% of the remaining particulate and a carbon filter that captures smoke and odors.

The range has a separate gun cleaning room with an independent air handler. The cleaning room is not only a convenience, but also helps prevent customers and employees from transporting dust to their home environment. Showers are also available. Used water is routed through five lead separation tanks before discharge to the sanitary sewer system. SPJC did not stop at range design to improve the environment for its customers and employees. Education was a large part of reducing lead exposure. No eating, drinking, or smoking is permitted at the range facility. Instructors attend lead awareness training and receive baseline blood lead level determinations. Originally, quarterly testing was scheduled, but a survey conducted during a rapid firing class where all attendees wore lead monitors revealed minimal exposure. As a result, the frequency of testing was changed from quarterly to annually.

SPJC strives to provide a safer environment for their customers and employees. Health and safety were primary considerations during the planning and development of the range. Reducing the exposure to lead has resulted in a cleaner environment and improved health for everyone at the range!

For additional information, contact the SPJC firing range at (727) 341-4471.

Resources

The following resources are available to assist you. Additional sources may be available in the phone book. Inclusion in the list of resources does not constitute endorsement by Pinellas County. Resources may provide additional services other than indicated.

Lead Recycling/Collection

P3 America's P2 Provider

4515 Oak Fair Blvd. Suite 103
Tampa, FL 33610
(813) 628-8888

American Waste

12 B Ellipse Bldg., Suite 216
Mt. Laurel, NJ 08054
1-800-673-7998

Sanders Lead Company, Inc.

P.O. Box 707
Troy, AL 36081
(205) 566-1563

Gulf Coast Recycling

1901 N. 66th St.
Tampa, FL 33619
(813) 626-6151

Range Equipment/Ventilation Systems/Maintenance

Range Management Service

720 Industrial Dr. #113
Cary, IL 60013
(847) 639-0011

Nilfisk of America, Inc.

300 Technology Dr.
Malvern, PA 19355
(610) 647-6420

Scanco Environmental Systems Inc.

5000 Highlands Parkway, Suite 180
Atlanta, GA 30082
(770) 431-0025

Caswell International

1221 Marshall St. N.E.
Minneapolis, Mn 55413
(612) 379-2000

Savage Arms, Passive Bullet Traps, Inc.

100 Springdale Rd.
Westfield, Mass. 01085
1-800-370-0712

Lead Free/Reduced Lead Ammunition & Suppliers

Blount, Inc.

Sporting Equipment Division
Box 856
Lewiston, ID 83501
1-800-666-5761

Powell River Laboratories, Inc.

127 Valley Court
Oak Ridge, TN 37830
(615) 482-0214

The Bunker Inc.

4240 114th Terr. N.
Clearwater, 34622
(727) 571-1791

Wolf Pack Arms & PoliceSupplies

3201 Dale Mabry Hwy S
Tampa, FL 33629
(813) 837-6120

Florida Bullet

1116 S. Myrtle
Clearwater, FL 34616
(727) 461-6081

Ranger Products

2623 Grand Blvd., Suite 209
Holiday, FL 34690
(813) 942-4652



Consultants & Engineers / Construction & Design

ACP, Inc.

P.O. Box 50
Safety Harbor, FL 34695
(727) 791-0668

Delta Environmental Consultants, Inc.

4200 West Cypress St. Suite 500
Tampa, FL 33607
(813) 289-5218

Monark Construction

14499 N. Malbry Suite 159
Tampa, FL 33618
(813) 960-4452

Tolson, Simpson, & Assoc.

6025 Corners Parkway, S
Norcross, GA 30092
(404) 263-1034

Waste Reduction Assistance Manual for Indoor Gun Ranges

Additional Resources

National Rifle Association of America

Range Department (703) 267-1417
Range Technical Team (703) 267-1432
NRA Range Loan Program (703) 267-1432

Florida Small Business Assistance Program

1-800-722-7457

National Lead Information Hotline

1-800-424-LEAD (1-888-424-5323)

Pinellas County Health Unit

Lead Intervention Team
(727) 824-6927

Recycling Hotline

1-800-947-3873

Southern Waste Information Exchange

1-800-441-7949

Waste Reduction & Technology Transfer (WRATT)

(205) 386-2807

Waste Reduction Resource Center (WRRC)

1-800-476-8686