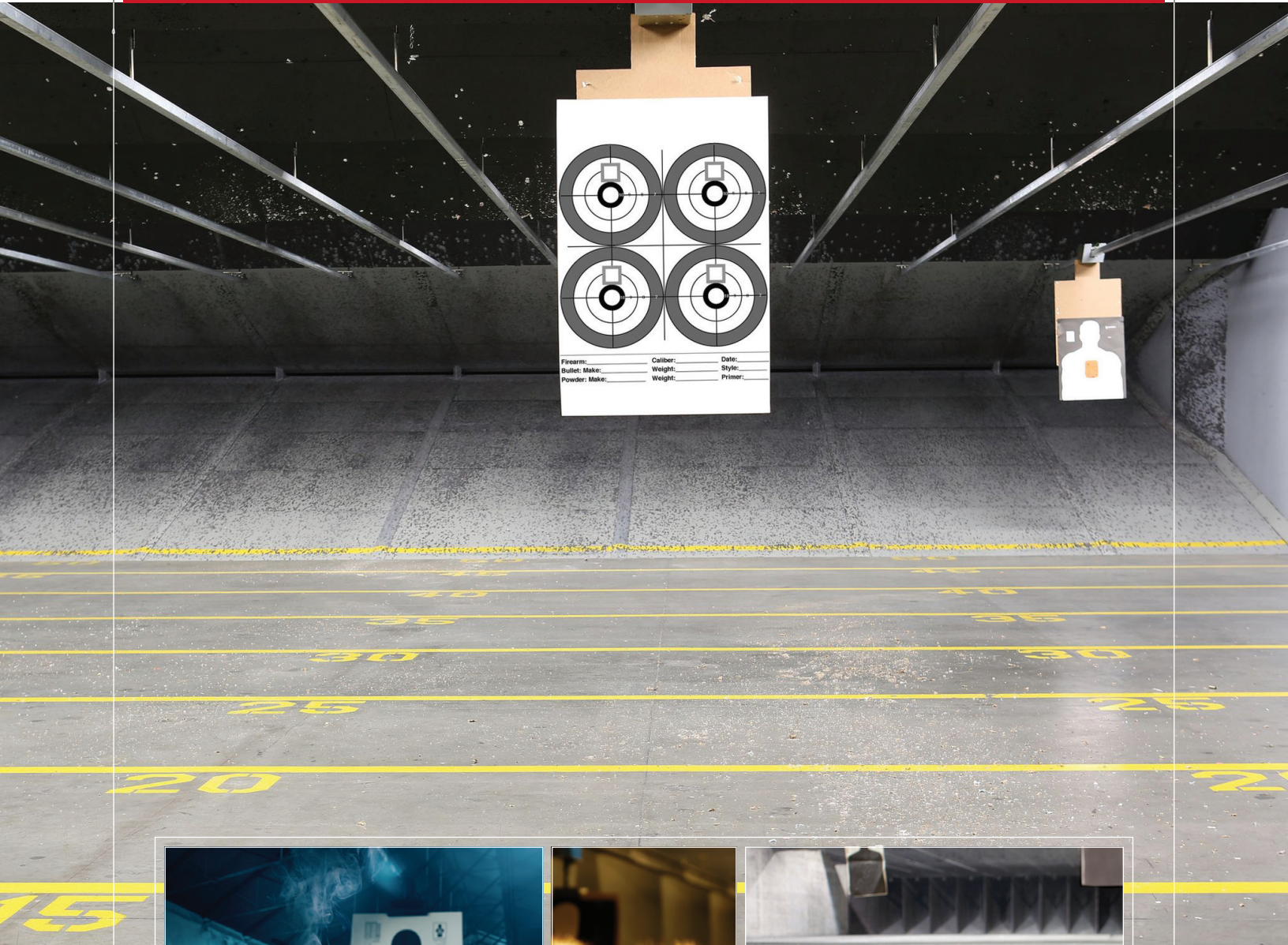


THE WORLD LEADER IN CLEAN AIR SOLUTIONS



# Indoor Firing Range Clean Air Solutions

**PARTICULATE AND GASEOUS FILTRATION**

**AAF | Flanders®**  
Bringing clean air to life.™

AAF Flanders has an in-depth understanding of the filtration challenges for indoor firing ranges.

This understanding and technical ability makes AAF Flanders the preferred partner in eliminating dangerous air contaminants in your environment.

# The Risks of Airborne Pollutants

## Contaminant Risk

Indoor firing ranges produce large quantities of airborne pollutants, including lead and noxious gases. The most significant potential source of airborne lead at the firing line is caused by the hot flames of burning gunpowder acting on the exposed lead base of a projectile. The metallic lead in the projectile can also become airborne lead particles through heat from friction between the bore of the firearm and an unjacketed lead projectile. Downrange, lead may become airborne from splatter caused by projectiles hitting backstops, floors, walls, or baffles.



In addition, maintenance and/or repair of the backstop or other range equipment may cause settled lead dust to become airborne. Improper cleaning of a range may also cause lead dust to become airborne. Ranges that allow lead dust to accumulate have increased lead exposure risks, since the accumulated dust can become airborne from muzzle blast and/or shooter

movement. Concentrations can easily exceed safe levels of exposure to workers and shooters, and failure to comply with the Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) regulations can result in significant fines for range owners.

## Controlling Contaminant Levels

By law, contaminant levels within an indoor firing range facility must be controlled.

- Lead must be limited to a level of 50 ug/m<sup>3</sup> averaged over an 8 hour period.
- Carbon monoxide must be controlled to 50 ppm.
- Surveys from the National Institute for Occupational Safety and Health (NIOSH) indicate that the majority of indoor firing ranges operate with air contamination levels far exceeding acceptable standards.

## Air Cleaning for Indoor Firing Ranges

AAF Flanders can help mitigate the risks associated with airborne pollutants and fumes that are created by the firing process.

- Meeting compliance standards for OSHA regulations pertaining to lead exposure
- Removing dangerous airborne contaminants and improving air quality, health, and comfort of employees and customers
- Mitigating potential consequences and hazards attributed to toxic elements generated within firing ranges

## Industry Leader

AAF Flanders has an unmatched capability to understand complex air cleaning problems, and to develop effective solutions from conception through final installation. We are totally committed to the development and production of quality air filtration.

AAF Flanders specializes in airborne particulate and gaseous contaminant removal for indoor firing ranges. A complete variety of filters and gas-phase media are available. All AAF Flanders products are designed to comply with applicable standards and practices. In addition, we can custom design commercial air filtration products to meet the most demanding airflow and efficiency requirements.



# Managing Airborne Pollutants

## Regulations and Standards

While by law OSHA regulations only apply to employees, every indoor range, including club ranges, can use them as an important reference. OSHA has a comprehensive lead regulation (29 CFR 1910.1025). Failure to comply with the requirements of the Lead Standard could result in fines to range owners, in addition to jeopardizing the health and well-being of those exposed to the contaminated air.

## Signs and Symptoms of Lead Poisoning

Lead can enter the body by being inhaled or swallowed. Lead can be inhaled when lead dust or fumes are released into the air. When lead enters the bloodstream, it circulates throughout the body. Early signs and symptoms of lead poisoning include:

- Fatigue
- Irritability
- Sleeplessness
- Uneasy Stomach
- Metallic "Taste"
- Poor Appetite
- Headaches
- Reproductive Problems
- Nervousness

## The Filtration System

The primary purpose of the ventilation system is to prevent the buildup of toxic gases (CO<sub>2</sub>, CO, NO) and particulates, such as lead and other discharge products.

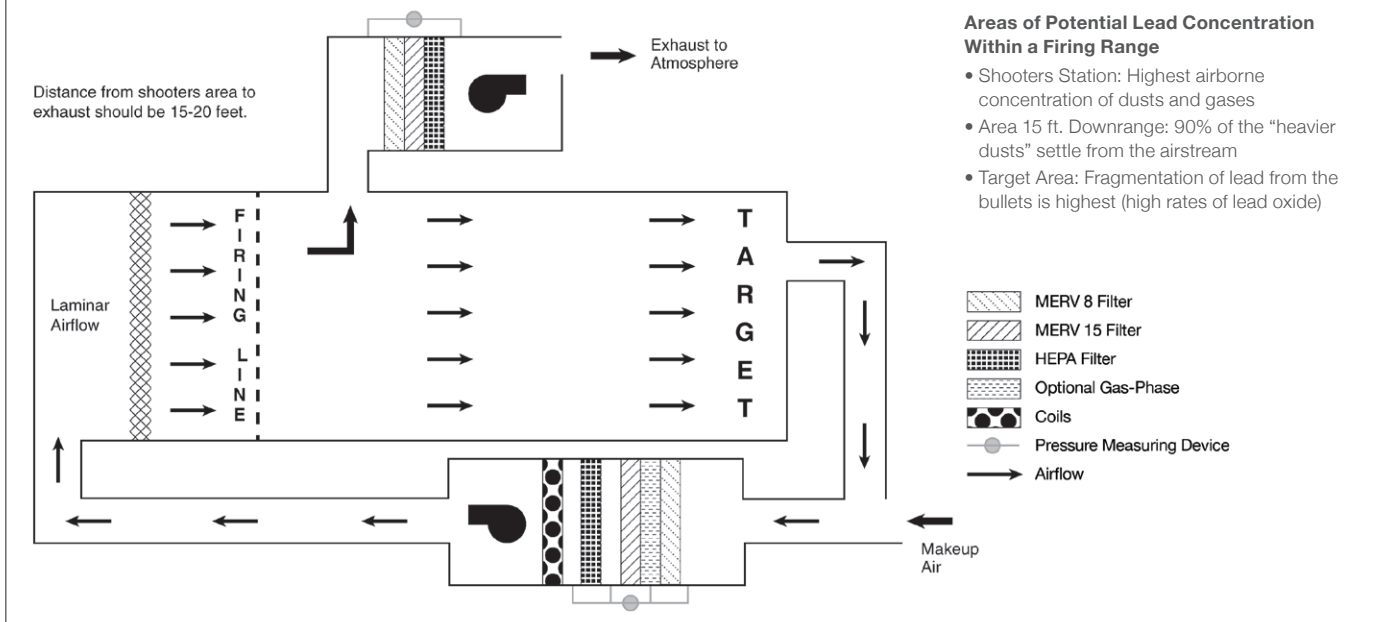
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AAF Flanders recommends two types of air cleaning systems for indoor firing range facilities.

- Recirculation systems – lowest energy use
- Exhaust air systems – higher energy use

## Recommended Air Filtration Solutions for Indoor Firing Ranges



# Clean Air Technology

## TCO Diagnostic®

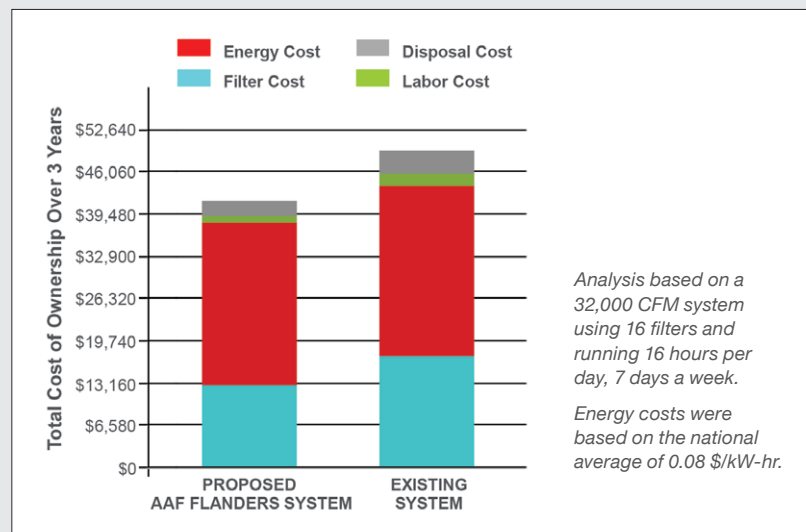
A thorough air filter audit of your HVAC Systems is the first step that AAF Flanders takes, in order to provide you with professional guidance and analysis for cost savings and risk reduction. By conducting this audit, we will be able to understand your current state and then utilize TCO Diagnostic®, an advanced analytical software tool, to identify how your facility can perform even better.

The purpose of TCO Diagnostic is to assist you in selecting the best filters for your air handling systems and to understand their sensitivity to your operating conditions, in order to operate your system in the most optimal and effective manner.

TCO Diagnostic provides the insight to identify improvement opportunities, find the optimized options, and tailor to your specific needs for a comprehensive purchase perspective—improving air quality, energy savings, and operational flexibility while reducing total cost of ownership.



Upgrading to an AAF Flanders recommended system saves almost \$8,000 in filter, energy, disposal, and labor costs over three years.



## Disposal of Filters Contaminated with Lead Dust

What you need to know:

1. Disposal of used filters from indoor firing ranges can be classified as hazardous waste, and must be disposed of according to federal and state regulations through a licensed hazardous waste company.
2. Personal protection should be worn at all times when entering or opening an AHU inside a firing range.

# Particulate and Gaseous Contaminant Solutions

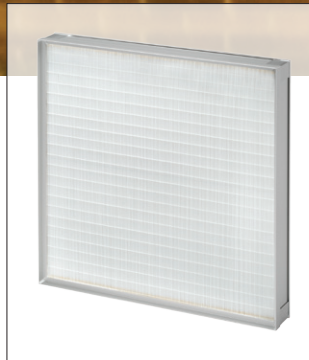
## HEPA/ULPA Filters

HEPA filters are the most efficient air filters commercially available, and are used in applications requiring ultra-clean air. HEPA filtration is therefore a critical element of any indoor firing range HVAC system. AAF Flanders experts recommend recirculating all air through a fully functioning HEPA filter system.



The HEPA/ULPA Filter line features:

- Efficiencies 99.97% – 99.99999% on 0.10 to 0.20 micron particles
- Patented pending, high performing ePTFE Filtration Technology—designed to meet the demanding airflow and efficiency requirements of the most critical applications
- Chemical-resistant capabilities for highly corrosive environments
- Available as a separatorless media filter with a self-supporting media pack
- High capacity, space saving designs
- Filters designed specifically for high airflow applications requiring HEPA efficiency at an ultra low pressure drop



## Pleated Panel Filters

The AAF Flanders pleated panel filter line provides the industry's broadest selection of high performance, high capacity filters, including specialty and standard capacity options. Typical service life of a prefilter in an indoor firing range can be as short as two weeks. Due to frequency of changeouts, extending the life of the first stage filters offers the most dramatic reduction in employee exposure to contaminated filters. Less changeouts also reduce the environmental impact.



The Pleated Panel Filter line features:

- MERV ratings from 8 to 13
- Strongest and longest-lasting MERV 8 pleated filter on the market
- Industry's lowest life cycle pressure drop and highest Dust Holding Capacity (DHC) reduces energy consumption and total operating costs
- Highest performing self-supported pleated filter on the market
- High efficiency MERV 13 pleated filter supports achievement of LEED credits by significantly improving Indoor Air Quality (IAQ) and reducing energy consumption
- Filter options for high temperature and high velocity environments



## High Efficiency Extended Surface Filters

These rigid, extended surface filters are ideal for use in all high efficiency applications. The supported pleat filters provide strength and integrity in high flow, turbulent, and variable airflow conditions. The rigid configuration minimizes the potential for re-entrainment of captured particles during disposal and handling.



The High Efficiency Extended Surface Filter line features:

- MERV ratings from 11 to 16
- Most energy efficient 4" filter available with longer life and lowest initial resistance
- Patented Impress® Technology delivers a higher DHC and a lower pressure drop for greater energy efficiency
- Heavy-duty construction and high performance in tough operating conditions
- Dual density media increases DHC and reduces operating costs
- 100% separatorless and self-supporting microglass filters for easy disposal
- Inline space-saving designs for high efficiency without having to compromise space



## Gaseous Filtration Solutions

AAF Flanders has assumed an industry leading position with the development of its innovative SAAF™ (pronounced as "SAFE") product line, designed to reduce or eliminate harmful gaseous contaminants. In combination with our expertise in airborne particulate filtration, SAAF products and solutions allow us to develop unique and effective total filtration solutions to protect people, processes, and environments.



The SAAF product line features:

- Patented chemical media cassettes with superior sealing and energy savings
- Complete chemical media line – adsorbents, oxidants, and blends configured by and produced under the supervision of our world-class global research and development teams
- Gas-phase chemical filters and cassettes eliminate the buildup of noxious and unpleasant odors for employees and patrons when used on recirculation systems
- Environmental Measurements related to the ISA Standard S71.04: "Environmental Conditions for Process Measurement and Control Systems. Airborne Contaminants to determine types of contaminants and their relative concentrations"



## Proven Expertise of AAF Flanders

AAF Flanders offers the most comprehensive air filtration portfolio in the industry, including particulate and gas-phase filters, to provide a customized clean air solution. Each product is carefully designed, manufactured, and tested in full compliance with all applicable standards to meet the most challenging demands with the lowest Total Cost of Ownership.

Contact your local AAF Flanders representative for a complete list of AAF Flanders Air Filtration Product Solutions.

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AAF Flanders has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

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ISO Certified Firm

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