



CA Performance
Horses &
Marketing

Particulate Matter

What is it, and how does it affect the equine industry?

RESPIRATORY HEALTH

Respiratory health is crucial in the equine industry for promoting performance, well-being, longevity, and economic viability. Learning more about what is in the air around your horses is a vital part of ensuring healthy and productive members of the equine community.

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Equipment Used: Aeroqual Ranger
Supplied By: Gas Sensing

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Barn Used: Swanson Horse Company
Facebook - Swanson Horse Company

Owner: Coleman Swanson

What is Particulate Matter?

Particulate matter (PM) refers to a complex mixture of tiny solid particles and liquid droplets suspended in the air. These particles vary in size, composition, and origin, ranging from natural sources like dust and pollen to human-made pollutants such as vehicle emissions and industrial byproducts. PM is categorized based on size, typically into PM₁₀ (particles with a diameter of 10 micrometers or less) and PM_{2.5} (particles with a diameter of 2.5 micrometers or less), with PM_{2.5} being of particular concern due to its ability to penetrate deep into the lungs and even enter the bloodstream.

PM₁₀

- **PM₁₀ (Coarse Particles)**

PM₁₀ includes particles with diameters of 10 micrometers or smaller. These particles are larger and more visible, often consisting of dust, pollen, mold spores, and some airborne pollutants.

PM₁₀ particles can irritate the eyes, nose, and throat when inhaled and can cause respiratory symptoms such as coughing and wheezing. They can also contribute to reduced visibility (haze) and soiling of surfaces in urban and industrial areas.

Sources of PM₁₀ include road dust, construction activities, agricultural operations, industrial processes, and natural sources such as wildfires and volcanic eruptions.



PM_{2.5}

- **PM_{2.5} (Fine Particles)**

PM_{2.5} includes particles with diameters of 2.5 micrometers or smaller.

These particles are smaller and can penetrate deeper into the respiratory system, reaching the lungs' alveoli and even entering the bloodstream.

PM_{2.5} is associated with more severe health effects, including respiratory and cardiovascular diseases, as well as premature death.

Common sources of PM_{2.5} include vehicle emissions, industrial combustion processes, power plants, wildfires, and agricultural burning. PM_{2.5} is a major concern for air quality management due to its significant health impacts and widespread presence in urban and industrialized areas.

How does Particulate Matter affect the equine Industry?

The equine industry should care about particulate matter for several reasons:

- **Respiratory Health:** Horses, like humans, are susceptible to respiratory conditions when exposed to high levels of particulate matter. PM can irritate the respiratory tract, leading to conditions such as coughing, nasal discharge, bronchitis, and even more severe ailments like heaves (equine asthma) or inflammatory airway disease. Prolonged exposure to high levels of PM can exacerbate existing respiratory conditions and impair the performance and well-being of horses.
- **Breeding and Production:** Broodmares exposed to high levels of particulate matter may experience respiratory issues like coughing, nasal discharge, and difficulty breathing. These problems can not only impact the mare's health but also potentially affect her ability to carry a pregnancy to term or influence the health of the developing foal. High levels of air pollution have been linked to increased risks of miscarriage, preterm birth, and low birth weight.
- **Performance and Productivity:** Healthy respiratory function is crucial for equine athletes' performance and productivity. High levels of PM in the air can compromise lung function, reduce oxygen intake, and impair cardiovascular efficiency, ultimately impacting horses' ability to perform at their best, whether in racing, competition, or everyday activities.
- **Increased Risk of Infections:** Inhalation of PM can weaken the respiratory system's defenses and make horses more susceptible to respiratory infections, such as bacterial or viral respiratory diseases. Additionally, high levels of PM can create favorable conditions for the proliferation of bacteria and fungi in the respiratory tract, increasing the risk of secondary infections.
- **Long-Term Health Effects:** Chronic exposure to high levels of particulate matter can have long-term health effects on horses, including irreversible lung damage, chronic respiratory conditions, and decreased quality of life. Persistent respiratory issues may require ongoing management and treatment, leading to reduced productivity, increased veterinary costs, and compromised well-being for affected animals.



Particulate Matter in Action

I had the privilege of working with Coleman Swanson of Swanson Horse Company to educate him on particulate matter and the dangerous it can possess in a training/breeding facility.

INITIAL READINGS

Coleman Swanson is a colt starter, breeder and stud owner near Canton, South Dakota. His early beginnings of hard work and continued education have landed him his own indoor arena and stall barn.

The home to *CHICS GUN DUNIT* out of \$22 million dollar sire *SMART CHIC OLENA*, Swanson is no stranger to the issues indoor arenas can have. We set up our Aeroqual Ranger to test how much particulate matter was in the air before turning on fans or laying down magnesium chloride.



The Aeroqual Ranger is able to detect matter every second for a quick and accurate log. Coleman is currently putting first rides on a few *Pink Ruby Buckle* mares, so this was the perfect condition to test the air quality in the indoor arena. After a few graceful circles, the Ranger was already reading over 50 mircons (PM2.5). At that level, particles are small enough to penetrate deep into the respiratory system, reaching the lungs' alveoli, where oxygen is transferred into the bloodstream. Your horse is not only having to work hard moving, but also breathing.



While the arena didn't seem too dusty, the meter didn't lie - this is why equipment to measure particulate matter is so important.

To combat this issue, Coleman has exhaust fans as well as magnesium chloride on hand. Once these changes were added to the arena, the particulate matter subsided to a much lower and acceptable level.

Colt starters, breeders and owners in general should be aware of the environment that their horses are taking in. Coleman's willingness to learn not only about training but the environment he was creating and changing, are what make him an asset to the horse industry.

Ways to Combat Particulate Matter

Combating particulate matter (PM) in the horse industry is essential for safeguarding equine health and promoting a safe and healthy environment for both horses and humans. Here are several strategies to mitigate PM in equine facilities:

1. Barn Management Practices: Maintain a clean and well-ventilated stable environment to reduce dust accumulation. Regularly remove bedding, manure, and debris from stalls and aisles to minimize airborne particles. Use dust-free or low-dust bedding materials, such as paper-based bedding, wood shavings, or rubber mats, to minimize dust production and respiratory irritation. Implement effective manure management practices, such as composting or proper disposal, to prevent the buildup of organic matter and reduce odors and airborne particles.

2. Adequate Ventilation: Ensure proper ventilation in stables, barns, and indoor riding arenas to facilitate air exchange and reduce indoor air pollution. Install fans, windows, vents, or mechanical ventilation systems to promote airflow and remove stagnant air. Position ventilation openings strategically to minimize the entry of outdoor pollutants, such as vehicle exhaust or agricultural dust, into indoor spaces.

3. Dust Control Measures: Use dust control additives or suppressants, such as water, magnesium chloride or specialized products, to mitigate airborne dust in indoor and outdoor areas. Apply these products to arenas, riding surfaces, and high-traffic areas to suppress dust and stabilize footing. Water down dusty surfaces regularly, especially in arenas and exercise areas, to reduce dust emissions and improve air quality. Consider using dust control mats or sprinkler systems at stable entrances to capture dust and debris from horses' hooves and prevent it from being tracked indoors.

4. Pasture Management: Practice good pasture management techniques, such as rotational grazing and soil conservation measures, to minimize soil erosion and dust generation in outdoor areas. Provide ample access to clean water and forage to encourage horses to graze and reduce their time spent in dusty environments, such as dry lots or barren paddocks.

6. Education and Awareness: Educate horse owners, trainers, and facility managers about the importance of air quality and respiratory health in equine management. Provide training on proper stable management practices, ventilation strategies, and dust control techniques to minimize PM exposure and promote a healthy environment for horses and humans alike.

By implementing these strategies and adopting a proactive approach to PM management, the equine industry can effectively combat particulate matter and create safer, healthier environment.

How to measure Particulate Matter

Gas Sensing is a proud American company located in Inwood, Iowa. Their purpose is to provide quality gas monitoring products to satisfy all your safety and control needs.

- **The Aeroqual Ranger:** The Aeroqual Ranger is a cloud-connected portable monitoring solution for industrial and occupational hygienists and environmental health and safety professionals. Used by innovative industrials, environmental consultants and more, Ranger offers a cutting-edge solution to some of the most urgent pain points facing air quality monitoring today.
 - Cost starting at \$2,930.00
- **The Aeroqual S-500:** The Series 500 lets you log data for the gases you measure, making your record-keeping easy. It can also interface with your external control systems, making it a simple solution for those needing alarms or exhaust fans controlled for safety purposes.
 - Cost starting at \$1,125.00
- **The Aeroqual S-300:** The Series 300 allows portable monitoring and controls in a single package. When stationary, the Series 300 has relays and voltage outputs that can interface with your dataloggers or control systems. When on the move, the rechargeable battery gives you hours of safety monitoring that you can take with you.
 - Cost starting at \$710.00

Purchasing out of your budget? Gas Sensing also has rental options for Particulate Matter. Contact Abby at Abby@gas-sensing.com or Sales@gas-sening.com



I would like to thank Swanson Horse Company in Canton, South Dakota for allowing us onto your property and educate what particulate matter is and why its important. Coleman Swanson of Swanson Horse Company has taken steps to ensure his facility is well ventilated and cleaned thoroughly to keep client horses healthy and performing their best. Great horses are made when trainers give them a healthy environment.

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