

THE WORLD LEADER IN CLEAN AIR SOLUTIONS



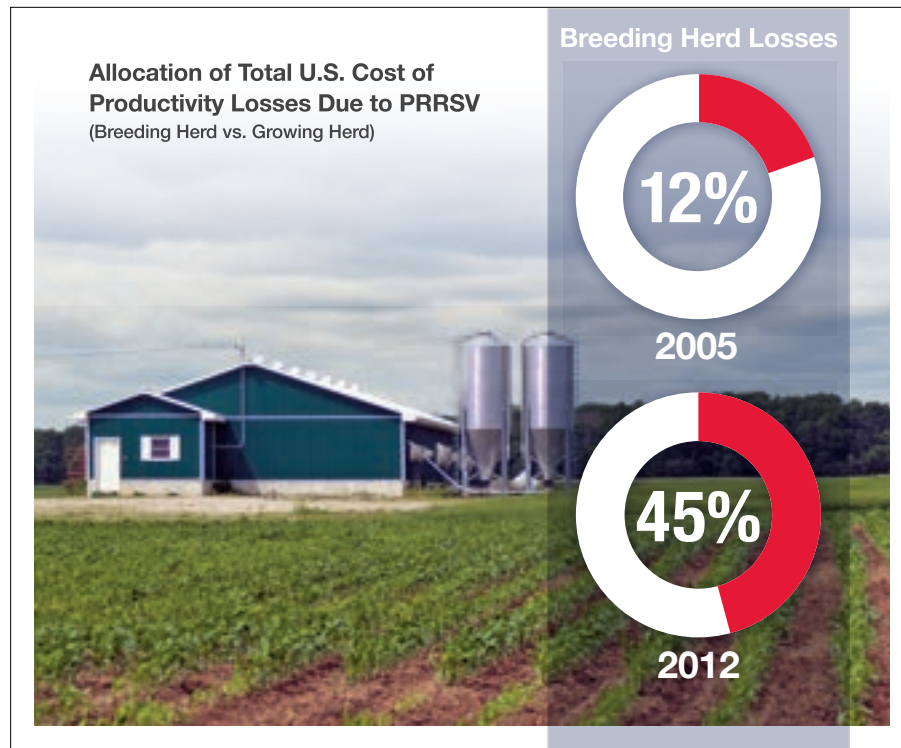
Preventing Outbreaks in Swine Environments

FILTRATION FOR AIRBORNE DISEASES

Air Filtration Solutions for Preventing Costly PRRS Outbreaks

A Significant Threat to Your Herd and Your Bottom Line

The pandemic Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) was first recognized in the United States in the late 1980s. Despite more than 25 years of intensive research and efforts to combat the virus, it remains a significant threat to sow farms in the U.S. and abroad. While productivity losses resulting from the impact of the disease on growing herds have been reduced over the past decade, this progress is offset by significantly increased losses in breeding herds.



The Devastating Effects of PRRSV

While the severity and long-term effects of PRRS may vary, the potential for devastating losses remains consistent. With an acute outbreak, more than half of a herd's litters may be affected.

Effects on Breeding Herd

- Anorexia
- Fever
- Cyanosis
- 1% – 2% increase in mortality
- 1% – 2% increase in late-term abortions
- Up to 20% increase in premature farrowing
- Dead and mummified piglets in farrowed litters
- Variations in breeding and farrowing intervals
- Temporary decline of semen quality
- 10% – 40% percent increase in pre-weaning piglet mortality
- Increased prevalence of secondary infections

Effects on Growing Herd

- Increased mortality in conjunction with increases in other respiratory infections
- Slower growth rates
- Non-uniform performance
- Potential for persistent respiratory disease with secondary infections

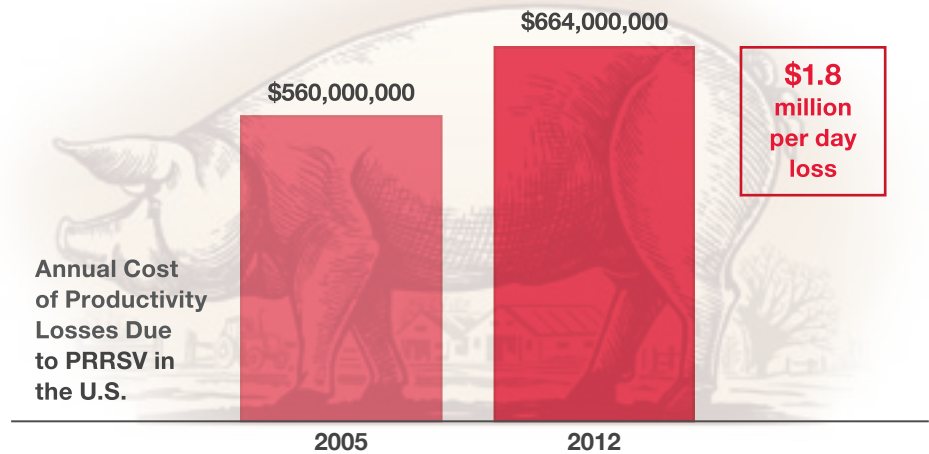


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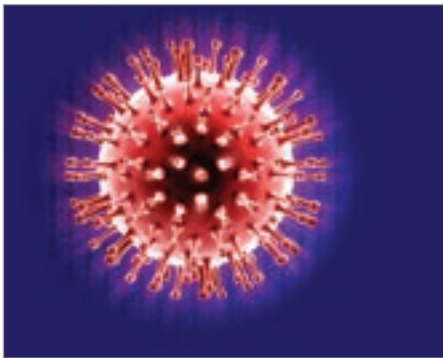
Assessing Your Risk

While a PRRS outbreak is not the only risk a sow farm has to consider when allocating capital for operations, it is one that should be given serious consideration based on its potential to significantly impact production and costs. Research findings on the impact of the disease clarify the risk of substantial losses due to an outbreak.

A 2013 study published in the *Journal of Swine Health and Production* estimated the **annual cost of productivity losses due to PRRSV in the U.S.** national breeding and growing-pig herds at **\$664 million, up from \$560 million in 2005**, equating to a **loss of \$1.8 million per day** by the U.S. pork industry. An **additional \$477.8 million is estimated to be lost each year on outbreak related costs**, including animal care and biosecurity.



The Potential Impact of PRRSV From the Perspective of an Individual Sow Farm



Acute PRRS outbreaks in four breeding herds in Illinois **cost an estimated \$100, \$170, \$428, and \$510 respectively per breeding female**, based on decreases in the production of weaned pigs and increased treatment costs.¹



A four-month outbreak in a 250-sow herd in Minnesota **cost an estimated \$59,000, \$236 per breeding female**, for one year following the outbreak, based on lost opportunity for revenues on 966 pigs that would have been produced had the herd performed at the baseline productivity levels of the previous three years.²



A feeder-pig operation with an endemic PRRSV infection in the nursery reported a **70% loss in profits** due to a reduction of over \$5.00 per pig attributed to the nursery stage alone, based on decreased growth rates, increased feed conversion, and increased mortality.³

The likelihood of sustaining such losses due to an outbreak of PRRS is increased if your operation is located within a five mile radius of other sow farms. The virulent virus can travel airborne for five miles or more, and its ability to constantly change creates the potential for genetic evolution of the strain.

References:

1. Hoefling DC. Overview and history of SIRS. *Proc Ann Meet Livest Conserv Inst.* 1992;239-242.
2. Polson DD, Marsh WE, Ding YZ, Christianson WT. Financial impact of porcine epidemic abortion and respiratory syndrome (PEARS). *Proc IPVS. The Hague, the Netherlands.* 1992;132.
3. Kerkaert BR, Pijoan C, Dial G. Financial impact of chronic PRRS. *Proc Allen D. Leman Swine Conf.* 1994;217-218.



Air Filtration Is Your Front Line Defense Against PRRSV

Trials conducted by the University of Minnesota Swine Disease Eradication Center (SDEC) found that the risk of the indirect spread of PRRSV can be reduced with a comprehensive biosecurity program which includes air filtration. Some ventilation systems in swine facilities are designed to supply fresh air and control the inside temperature, however, they are not optimally designed to provide air filtration. An effective air filtration system traps the airborne virus and its contaminants, preventing it from entering a facility and spreading throughout.

PRRSV can be transmitted by a variety of hosts in addition to air, including humans, supplies, equipment, manure, water, insects, and semen. A biosecurity program that addresses these other methods of transmission is critical, but is not a substitute for the significant impact of air filtration in preventing the introduction of the virus to your herd. How important is air filtration in your defense against PRRSV? Facilities without proper air filtration are eight times more likely to have an outbreak than facilities with sufficient filtration.⁴

Ensure Maximum Protection and Efficiency from Your Air Filtration System

When you are ready to invest in an air filtration system to protect your herd and your bottom line from the ravages of PRRSV, adhere to the following requirements to ensure maximum protection and efficiency:

- Choose filters with a low resistance to airflow, which reduces the number of filters needed, eliminating or decreasing the need for additional filter housings and building extensions; lowers energy consumption and labor costs; and reduces waste
- Ensure buildings are airtight
- Accurately monitor differential pressure between the interior and exterior of your building
- Ensure filter brackets are airtight upon installation
- Choose filters with the recommended level of filtration for your facility and level of risk
- Follow manufacturer recommendations for replacing filters
- Install an efficient backdraft damper

It Pays to Invest in Air Filtration

While cost is always a significant consideration, you must consider whether your operation can afford not to invest in an air filtration system. A single outbreak of PRRS can cost two times more than investing in a filtration system, or the equivalent of operating the system for four to five years. The bottom line is that if your decision prevents one severe outbreak, it has paid for itself.⁵

The cost of equipping your facility with filters varies based upon the configuration, age, and maintenance history of your building and equipment, with newer facilities generally requiring less of an investment to filter.

Comprehensive Protection for Swine Farms

PRRS is a major concern for sow farms and boar studs. Air filtration prevents airborne pathogens, including PRRSV, from entering and spreading throughout a farm, preventing costly outbreaks of a broad range of diseases that impact swine health, production, and operating costs.

An air filtration system implemented to protect against the virulent PRRS virus also prevents airborne transmission of endemic *Mycoplasma Hyopneumoniae* (M-Hyo), the cause of Enzootic Pneumonia and Porcine Epidemic Diarrhea (PEDv), which is currently a significant threat to European farms, and is being monitored closely by the U.S. Department of Agriculture.

Air Filtration Solutions to Protect Animal Health and Profitability

AAF, the global leader in air filtration, produces systems to maintain positive Indoor Air Quality (IAQ) and prevent airborne transmission of pathogens that cause costly outbreaks of diseases impacting animal health, production levels, and operating costs.

Our filters have high minimum efficiency reporting value (MERV) ratings for their efficiency in removing dust particles and airborne contaminants, including disease-causing viruses and bacteria, from the air. With rated efficiencies through mechanical filtration, dual density non-charged media, and high moisture resistance, AAF filters provide maximum performance, durability, and energy efficiency. Moisture resistant filters, frames, and components prevent degradation and clogging in high moisture environments, such as sow farms using evaporating cooling systems for temperature control. Extremely durable, our filters have longer lifecycles, resulting in reduced maintenance costs and less waste.

References:

4. Dee, S., Cano, J.P., Sprank, G., Reicks, D., Ruen, P., Pitkin, A. and D. Polson. 2012. Evaluation of the long-term effect of air filtration on the occurrence of new PRRSV infections in large breeding herds in swine-dense regions. *Viruses*, 4 : 654-662.
5. Ricard, M. and Pouliot, F. 2013. Air Filtration in Swine Buildings. : Centre de développement du porc du Québec inc., 10 p.

AAF Air Filtration Solutions

AAF offers air filtration solutions and climate control options to meet the unique needs of your farming operation, protecting animal health and profitability.



MEGApleat® M8 (MERV 8)

- Extended surface pleated panel filters provide the highest dust holding capacity and longest life
- Designed for industrial applications with high moisture and heavy loading
- High airflow and maximum dust holding capacity reduce energy consumption



VariCel® VXL

- Available in MERV 15, MERV 14, MERV 13, MERV 11
- High efficiency supported pleat filter designed for industrial applications and high moisture environments
- The VariCel VXL ULTRA MERV 15 and MERV 14 includes antimicrobial treated media
- Dual density, noncharged fiberglass media

PerfectPleat® HC (MERV 8)

- Highest performing self-supported pleated filter on the market
- Designed to consistently increase efficiency throughout service life
- Ideal for replacing other pleated filters to increase performance
- The PerfectPleat ULTRA MERV 8 includes media with antimicrobial



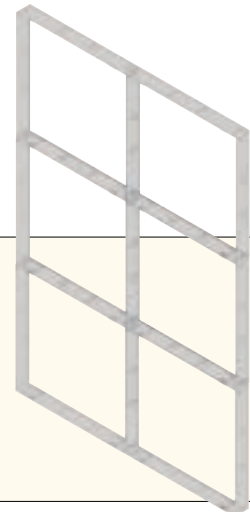
BioCel® VXL (MERV 16)

- High efficiency extended surface filter providing near HEPA-level filtration efficiency with a much lower initial pressure drop than HEPA filters
- Designed to remove airborne biological contaminants in critical commercial settings
- The BioCel VXL ULTRA MERV 16 includes antimicrobial treated media



FASeal™ SS Framing System

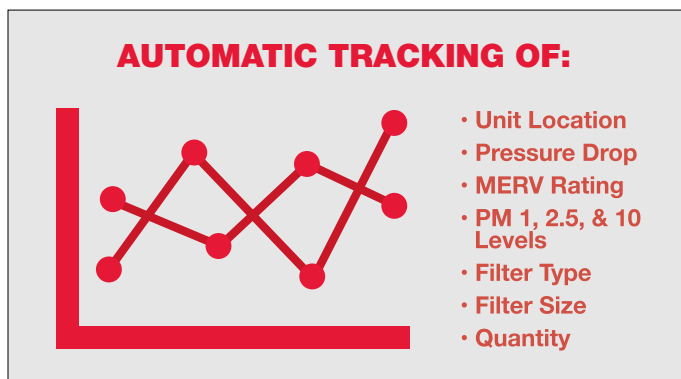
Clip-free and easy to install, the FASeal SS framing system is designed specifically for the unique requirements of your operation. With an interlocking design that allows a combination of frames to form a grid, it provides the ability to build-up modular filter banks of prefilters and final filters that will hold in place in horizontal applications. These frames are durable and corrosion resistant, creating a lasting, airtight seal to prevent the entry of pathogens into your facility.



Clean Air Technology

Sensor360™ Program

What was invisible is now visible with the Sensor360™ program. A new app enabled portable device is now available to optimize your total cost of ownership for clean indoor air. A handheld reporting tool that provides real-time monitoring of your filter system's performance, the Sensor360 program automatically tracks unit location, pressure drop, MERV rating, PM levels 1, 2.5, and 10, filter type, filter size, and quantity. This monitoring program gives you the ability to proactively resolve potential issues in air quality before they arise. With the Sensor360 program, you can optimize preventive maintenance scheduling, decrease deferred maintenance, save money, reduce risk, and gain time.



Real-Time Facility Monitoring

With the Sensor360 program, facility managers are immediately alerted to IAQ threats. They will receive an alert from the Sensor360 app on their phone or tablet that particulate levels are at an unacceptable concentration, enabling them to resolve issues before they negatively impact animal health. Sensor360 is the first IoT (Internet of Things) patented technology platform that directly correlates filtration system performance and IAQ by tracking and communicating particulate penetration levels in real-time. In addition, the program also tracks and communicates the life cycle status of filters and their associated total cost of ownership, to help optimize changeout points.

On-Demand Air Quality Analytics

First, battery-powered sensors are installed to measure both particulate concentration before the air is filtered and to measure IAQ. Pressure monitors are integrated into the current air handlers to record data and provide a convenient way for the facility manager to monitor air filter performance, including when the optimal filter changeout point is approaching. All these sensors connect to a network gateway that, in turn, communicates (via the cloud) to an app installed on the user's phone, tablet, or computer.



Information about air filter performance is then as simple as consulting the Sensor360 mobile phone app, which can be customized with user-defined alerts. Rather than manually auditing and collecting filter data from the facility's air handling systems, the facility manager can now access filter information anywhere at any time. In addition, building occupants are able to see the quality of the air they are breathing, by consulting the Sensor360 app that displays both the indoor and outdoor air particulate levels. No other building automation system or monitoring tool currently in the marketplace offers this combination of rich filtration data and ease of use.

Your Partner in Animal Health and Profitable Farming

At AAF, we understand the threat that swine operations face from the virulent and costly PRRS virus, as well as other pathogens with the potential to have a significant impact on your herd, production levels, and operating costs. Our goal is to provide you with comprehensive information for assessing your risk, filtration investment strategies to reduce your risk, and the projected return on your investment. If you have made the decision to make air filtration your front-line defense against airborne transmission of PRRS and other pathogens, we have an air filtration solution to meet the unique needs of your facility and operations. AAF is the global leader in air filtration and the preferred partner for maintaining a healthy herd and profitable farming operation.

Proven Expertise of AAF

AAF 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 representative for a complete list of AAF Air Filtration Product Solutions.

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

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