AAF INTERNATIONAL

Bringing clean air to life.®

www.aafasia.com

2023

PRODUCT
CATALOGUE

Our Vision

AAF understands the vital importance of clean air. That's why we are committed to cleaning the indoor air around the globe to improve our quality of life, increase productivity, protect critical processes and equipment, and create products that advance the human condition.

AAF® INTERNATIONAL

Bringing clean air to life.℠

What's Inside

What's Inside

What's Inside

P&I PRODUCTS

Introduction

AAF Asia

More than **1100** staffs

over 30

sales Office and Distributors

AAF Asia **half a century**

in twenty-twenty two

Global brand, Regional presence, Localized service

In 1972 AAF Asia's regional headquarters was first formed in Singapore, which marked AAF's debut in Asia. Middle East started its operation in the year 1995 with four sales offices in Dubai, Abu Dhabi, Riyadh and Dammam. In the year 2000, China opened its doors to AAF which has plants in Suzhou, Shenzhen, Wuhan and Taiwan and presently expanded its operations with a total of 14 sales offices. As industries advanced and end users became more concerned with the indoor air quality and clean air technology, the demand for high efficiency air filters in the Asian market boosted, this led to the establishment of AAF Malaysia Manufacturing and Research & Development Centre in 2002 and is currently SEA's main headquarters. It's strategic location helped reduce delivery time, in addition, this multilingual and multicultural country also created a competitive edge in the business. AAF entered India in 2006 which has established two factories in Bangalore (headquarters) and Noida, after twelve years it had a total of six sales offices in India. In 2013, AAF Asia further expanded in Thailand which also has a favourable location reaching its neighbouring countries. In 2015, Australia was established with sales offices and warehouses in Sydney, Melbourne and Queensland. Recently, in 2018 PT AAF International Indonesia was set up to accommodate and to better serve the huge market demand in Indonesia. With over 1,100 staffs and growing, AAF Asia supports its local customers and distributors in New Zealand, Korea, Cambodia, Sri Lanka, Pakistan, Bangladesh, Vietnam and Philippines. With the continuous expansion of AAF Asia, it has occupied an advantageous position in the Asia market and has maintained the leading position in the air filter industry.

AAF understands the vital importance of clean air, that's why we are committed to cleaning the indoor air around the globe to improve our quality of life, increase productivity, protect critical processes and equipment, and create products that advance human condition. Our regional presence helps us address the diverse local requirements of Asian market wherein climate and environmental requirements differs very much from the other continents.

As global climate change rapidly, air filtration solutions are challenged daily, AAF Asia continues to develop innovative products that addresses new health threats, more reliable filter performance that imposes less to zero risks and air filtration solutions that offers remote monitoring. From disposable panel filters to high efficiency filters, we manufacture the widest range of air filters available in the market. We develop and introduce new filter designs throughout the industry, including pleated filters, extended surface bag filters, compact filters, ePTFE and eFRM HEPA filters. We manufacture filters in our cleanroom with ISO class 8 certification. Following strict quality procedures ensure that all AAF filters leaving the AAF factories are leak-free, perform according to applicable standards and are consistent with the individual customer requirements. For a clearer and simpler IAQ monitoring, our US based R&D team initiated the development of Sensor360, a portable air filter efficiency and system power consumption monitoring device and software that allows users to resolve potential issues before they negatively affect the air quality in a building and energy cost. With AAF you are confident that our products and services are bringing clean air to life.

Indoor Air Quality

Bringing clean air to life.™

Air is essential for life, and the quality of that air is critical. At any given moment, the air surrounding us and filling our lungs contains billions of particles too small to be seen, but powerful enough to impact our health, the operation of equipment and instrumentation, and manufacturing processes.

The Environmental Protection Agency (EPA) reports that the air indoors can be up to 100 times more polluted than the air outside. The leading cause of poor indoor air quality is a lack of proper air filtration, according to the American Medical Association. AAF, the world leader in air filtration solutions, is bringing clean air to life through unmatched expertise and innovation.

34% of American workers feel that poor IAQ had caused them to miss work

Up to **65%** of asthma cases in school-aged children could be prevented with proper IAQ

The Urgent Risk of Poor Air Quality

Indoor air quality (IAQ) has been identified by the EPA as one of the top five most urgent environmental risks to public health. The air we breathe at home, work, and school may contain a variety of contaminants in the form of gases and particles emitted by office machines, cleaning products, construction activities, carpets and furnishings, perfumes, cigarette smoke, water-damaged building materials, microbial growth (fungal, mold, and bacterial), insects, and outdoor pollutants.

An extensive body of scientific evidence demonstrates that short and long-term exposure to fine particle pollution, also known as fine particulate matter (PM), has harmful effects on the cardiovascular system, increasing emergency room visits and hospital admissions for heart attacks and strokes, leading to premature death. The respiratory system has also been shown to experience harmful effects, including asthma attacks.

"We inhale over **3,500 gallons** of air each day."

Those most at risk from particle pollution exposure include people with heart or lung disease, older adults, children, and people with lower socioeconomic status. Research indicates that pregnant women, newborns, and people with certain health conditions, such as obesity and diabetes, may also be more susceptible to PM-related effects.

Poor IAQ and its related health effects are commonly associated with improperly operated and maintained heating, ventilating, and air conditioning (HVAC) systems.

Indoor Air Quality

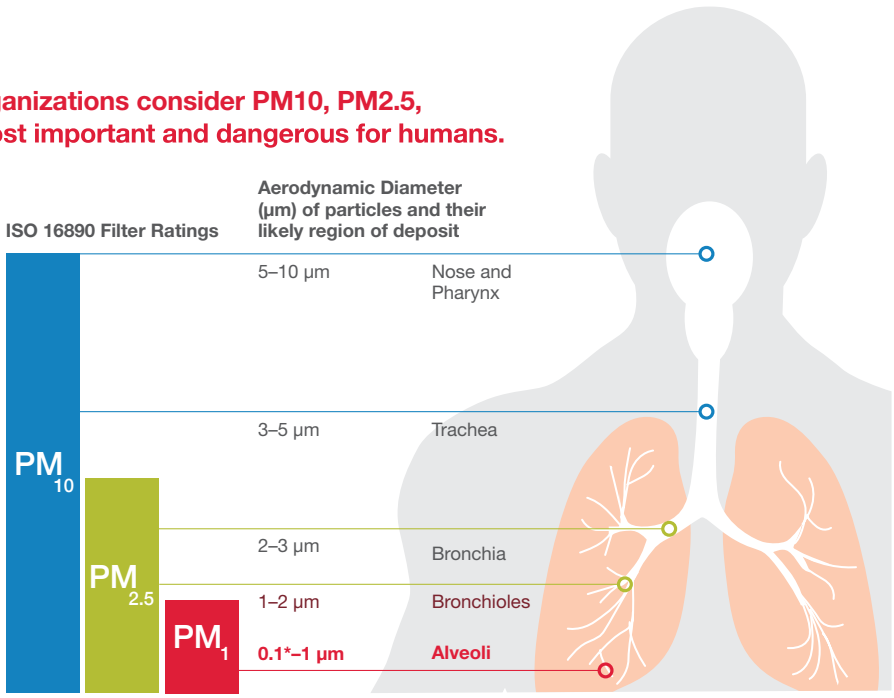
The world's leading health-related organizations consider PM10, PM2.5, and PM1 fine dust fractions as the most important and dangerous for humans.

Particles with an aerodynamic diameter of:

10 micron (ePM10)
deposit in the **nose and pharynx** of the human respiratory system

2.5 micron (ePM2.5)
are small enough to reach the **human lung** and deposit in the bronchia

1 micron (ePM1) or smaller
are small enough to find their way through the cell membranes of the alveoli into the **human blood stream** and cause life-threatening diseases



*Efficiency on particles smaller than 0.3 micron is not defined by ISO 16890.

For every **1000** workers poor IAQ results in sick days per year **600**

The Centers for Disease Control and Prevention (CDC) estimate that the majority of Americans spend approximately **90%** of their time indoors

Improved Air Quality Increases Employee Productivity

What are the benefits of a properly operated and maintained HVAC system? Studies have found that workers in buildings with optimum air quality have reduced symptoms related to exposure to fine particle pollution, resulting in lower rates of absenteeism. Improved IAQ has also been found to result in significant increases in worker productivity. Maximizing the level of filtration employed within the constraints of a building's HVAC system design is an important step in improving air quality, which provides a substantial return on investment.

Meeting the Growing Demand for Better Air Quality

Poor indoor air quality is one of the top complaints made by building tenants, according to a study by the International Facility Management Association. Occupants are demanding better air quality. In response, facility managers are demanding more from their air filtration solutions.

"The U.S. Indoor Air Quality market is expected to grow to **$11.4 billion** by 2019, with the equipment segment predicted to top nearly **$6 billion**."

Driven by increased consumer awareness, growing economies, and technological advancements, the IAQ market continues to grow at an extraordinary rate. Facility managers are faced with the challenges of keeping pace with the rapid changes occurring in this state-of-the art industry, while keeping costs in line and avoiding the risks associated with deferred maintenance. Meeting increased demands for optimal IAQ with limited resources requires a partner with the highest level of expertise and innovation in the field of air filtration solutions.

The Need for Effective Filter Monitoring

Delivering and maintaining optimal air quality requires effective monitoring and timely replacement of air filters. Unfortunately, decades of advancements in building automation have failed to include filtration monitoring. Facility managers have had to continue to rely on traditional methods of monitoring, which lack accuracy and pose significant risks, including HVAC system failure and work disruptions.

Common methods of monitoring air filtration performance include measuring differential pressure across the filter bank, which fails to consider the potential for small changes in pressure that result in large changes in airflow. Visual inspection of filters also fails to be an effective method of monitoring, due to the fact that fine particles are difficult or even impossible to detect with the eye. With scheduled filter replacements, you run the risk of replacing filters before needed or not replacing them before operating efficiency is significantly impacted, because the replacement schedule fails to account for seasonal changes in the external environment, or for changes in the building's occupancy.

The Risks of Deferred Maintenance

A lack of automated filter monitoring capabilities is not the only challenge facility managers have had to face in operating and maintaining their HVAC systems. The number one concern of facility managers is not having enough time to get the necessary work done. With significant budget and time constraints, they find themselves deferring maintenance and reacting to resulting issues, rather than employing preventive maintenance, which saves costs significantly over the long term.

"Studies have shown that **energy costs are up 81% in facilities with deferred maintenance issues**, and 71% of this increase is related to the HVAC system."

Automated Filter Monitoring Technology Saves Time and Money

Today, facility managers striving to meet building occupants' increased demands for optimal air quality while facing the challenges of time and budget constraints can breathe easier with the availability of automated filter monitoring technology. This latest advancement in building automation eliminates guesswork and provides accurate and immediate information on filtration replacement needs. This proactive approach to filter maintenance reduces energy, material, and labor costs, and prevents HVAC system failures and work disruptions resulting from inaccurate assessments of filter performance and deferred maintenance.

Partnering with AAF, the world leader in clean air solutions, enables you to navigate rapidly evolving market demands and technological innovations. With our extensive expertise and high performance products, you are equipped to deliver and maintain optimal air quality for healthier and more productive tenants, and more efficient and cost-effective operations.

Sources: U.S. EPA. Indoor Air Quality—The Inside Story: A Guide to Indoor Air Quality; CDC. Healthy Housing Reference Manual: Indoor Air Pollutants and Toxic Materials; Fisk, W.J. (2000). Health and Productivity Gains from Better Indoor Air Environments and Their Relationship with Building Energy Efficiency. Annual Review of Energy and the Environment; Wellesley, Mass., October 31, 2014–BCC Research, "U.S. INDOOR AIR QUALITY MARKET"; Tenant Satisfaction, Sustainability Link Revealed in DTZ Research, DTZ, 2015; Indoor air quality: the latest sampling and analytical methods, second edition, Hess-Kosa; State of the Air 2015, American Lung Association, 2015

50% of a facility's energy costs are attributed to heating, cooling, and moving air.

88% of facility managers say that deferred maintenance is an issue.

Deferred maintenance results in **$5 million** in annual facility operating costs. **36%** of companies surveyed say this number is even higher!

AAF History

AAF, the world's largest manufacturer of air filtration solutions, operates production, warehousing, and distribution facilities in 22 countries across four continents. We are committed to protecting people, processes, and systems through the development and manufacturing of the highest quality air filters and filtration equipment available today. Our company offers comprehensive, innovative air filtration solutions designed to remove and control airborne particulates and gaseous contaminants in commercial, industrial, cleanroom, and transportation applications.

While AAF is an international company, our global headquarters remain in Louisville, Kentucky, where AAF was founded in the 1920s. Bill Reed, a skilled engineer and entrepreneur, developed the Reed Air Filter in 1921. This creative filter solution for the automobile industry would establish the foundation for what is now a global leader in air filtration.

For the past 100 years, our world has increasingly demanded cleaner, more comfortable air. AAF and Flanders – whether separately or as a combined force – introduced most of the air filtration products currently in use. Our collective heritage revolves around innovation, and our complementary strengths uniquely position us today to meet the challenges of tomorrow.

Timeline

1921 Bill Reed founds Reed Air Filter Company and manufactures the first commercial air filter in the U.S., the Reed Air Filter.

1929 Reed Air Filter Company merges with seven leading air filter manufacturers to form American Air Filter Company Inc.

1936 American Air Filter (AAF) introduces the first high-efficiency box-style filter.

1939 AAF introduces first self-cleaning electrostatic percipicator.

1950 AAF introduces fiberglass replacement filters to the residential market.

1953 AAF introduces Roll-O-Mat, the first automatic self-renewable media filter.

1961 AAF introduces DriPak, the first bag-style filter.

1963 AAF introduces VariCel, the first modern high-efficiency box-style filter.

1964 AAF introduces the AstroCel HEPA filter.

1964 AAF becomes the first filtration company to also make their own HEPA media.

1968 AAF creates first separator-less HEPA fitler.

1969 NASA lunar module uses AAF filters in Apollo 11 mission to moon.

1968 AAF develops the first fluid seal for HEPA filters.

1970 AAF establishes Asian and European headquarters.

1978 AAF introduces first V-Bank HEPA filter.

1978 AAF makes the first ULPA filter.

1986 AAF creates Blu-Jel, the first slicone-based HEPA fluid seal.

1989 AAF introduces VariCel II, the first high-efficiency mini-pleat 4″ deep filter.

1993 AAF supplies HEPA fitlers to the International Space Station.

1999 AAF begins development of PTFE filters.

2000 AAF introduces PerfectPleat, the first self-supported pleated filter.

2009 AAF introduces MEGAcel I, first HEPA filter with ePTFE filtration technology.

2013 AAF introduces MEGApleat M8 filter.

2014 AAF introduces VariCel 2+ filter with Impress Technology.

2016 AAF introduces TCO Diagnostic filtration optimization tool.

2016 AAF opens Clean Air Innovation & Research Center in Jeffersonville, IN.

2018 AAF introduces Sensor360, the first IoT-based filtration monitoring and optimization tool.

2019 AAF introduces VisionAir Clean, cleanroom design and configuration tool.

2021 AAF celebrated 100 Years of Eminence of establishment since 1921.

2021 First introduced AAF Connect App, a smart clean air app with real time IAQ monitoring and smart automated control.

2022 AAF Asia celebrated 50 Years of establishment in Asia.

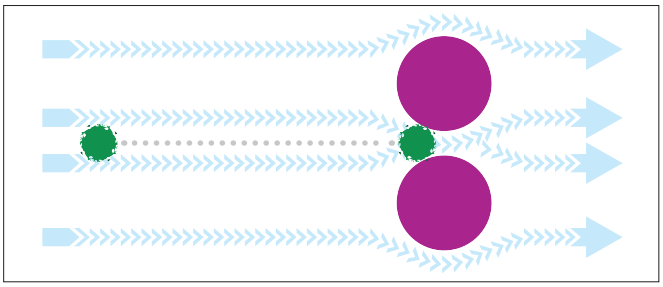
and more to come...

Principles of Filtration & TCO

Methods of Filtration

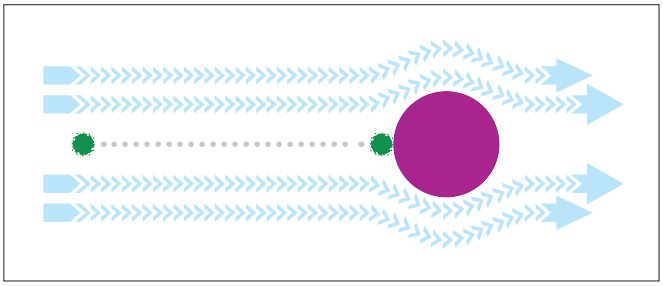
There are several methods of creating a safe and secure indoor environment. AAF takes great care in assessing and addressing the individual and specific needs of our customers and choosing the appropriate solution to any IAQ challenge.

Mechanical



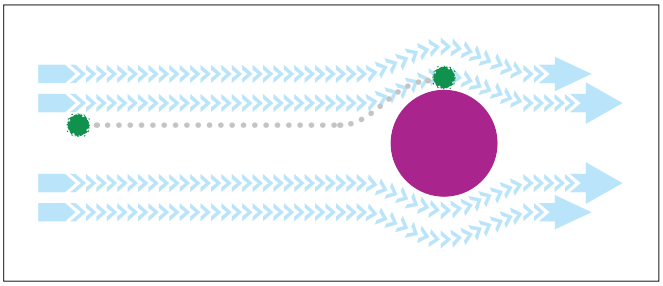
Straining

Straining occurs when a particle is larger than the opening between fibres and cannot pass through. It is a very ineffective method of filtration because the vast majority of particles are far smaller than the spaces between fibres. Straining will remove lint, hair, and other large particles.



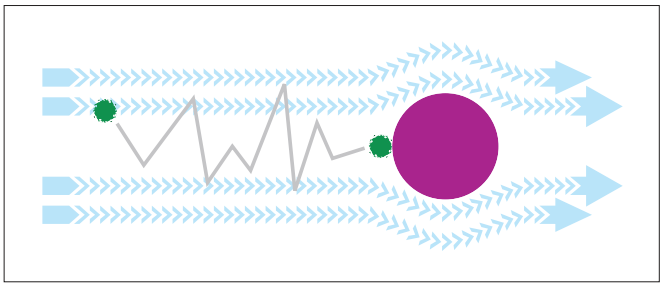
Impingement

As air flows through a filter, it makes repeated changes in direction as it passes around each fibre. Dirt particles, especially larger particles, cannot follow the abrupt changes in direction because of their inertia. As a result, they do not follow the airstream, and they collide with a fibre. Filters using this method are often coated with an adhesive to help retain particles on the fibres.



Interception

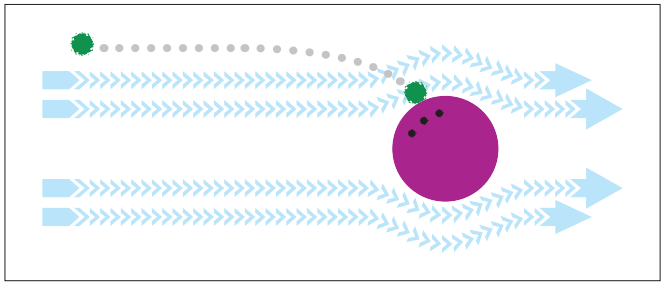
Interception is a special case of Impingement, where a particle follows the airstream, but because of its size in relation to the fibre, it comes in contact with the fibre. It is not dependent on the inertia of the particle to bring it into contact with a fibre. The particle is retained by the inherent adhesive forces between the particle and fibre, called “van der Waals” forces.



Diffusion

Diffusion takes place on particles so small that their direction and velocity are influenced by molecular collisions (called “Brownian movement”). They do not follow the airstream, but behave more like gases than particulate. These particles are battered across the direction of flow in a random “helter skelter” fashion. When a particle strikes a fibre, it is retained by the adhesive forces (van der Waals forces) between the particle and fibre.

Electrical



Electrostatic

The electrostatic method of filtration is based on the principle that objects carrying opposite electrical charges are attracted to one another. As particles enter the filter, they pass through the “ionizer” section, where a field with an intense positive charge is imparted to the particles. The particles are then carried by the airstream into the “plate” area, consisting of alternately charged collection plates. Positively charged particles are attracted to the negatively charged plates.

The accumulated dust load is removed from the plates in one of two fashions. Either the plates are periodically washed, or the dust load is left to “agglomerate” on the plates, until the enlarged particles are blown off the plates into the “storage section.” The storage section consists of either an automatic roll filter or extended surface filters.

Particle Efficiency and Resistance

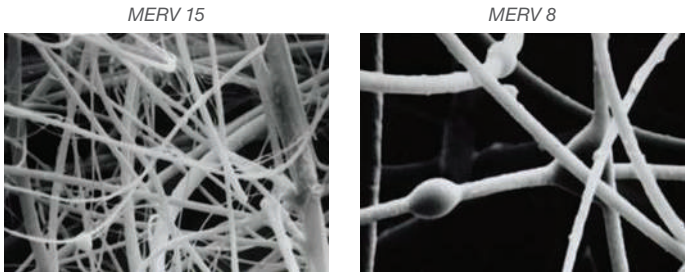
Factors Impacting Filter Choice

When considering which air filter to choose, the answer seems simple – just choose the one that removes the greatest amount of particulate from the airstream! However, in the real world there are far more factors impacting filter choice than merely particle efficiency. Chief among these factors is the impact of the filter on energy costs.

At the heart of the filter is media – the component of the filter where filtration actually happens. Many filter medias look fairly similar to the naked eye. However, look a little closer, and you can see some pretty stark differences.

Most lower-efficiency filter media has relatively larger fibers and primarily filters out large particles via straining or impingement. It also typically has wider openings between fibers that allow air to pass through relatively easily.

Higher-efficiency filter media, by comparison, typically has many smaller, finer fibers and can also filter by straining and impingement. By contrast, though, higher-efficiency media can capture smaller particles via interception and diffusion, too. In order to filter smaller particles effectively, this type of media typically has a dense web of small fibers with smaller openings for air to pass through. Therefore, if you were to have just a flat sheet of media, it would be more difficult for airflow to pass through the higher efficiency media.



MERV 15 vs. MERV 8 media under 2000x magnification

When it's difficult for airflow to pass through media, HVAC systems have to work harder, consuming more energy. Filters are generally designed to reduce this effect and consume as little energy as possible over their lifetime. In some cases, this need for energy efficiency means designing new and better medias (such as AAF ePTFE and eFRM medias) that reduce resistance.

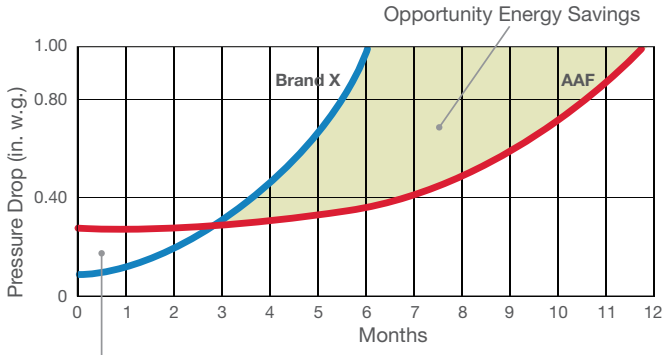
However, in many cases it means configuring the filters in a new way. Most of the major advances in filter design over the years, such as the DriPak®, the VariCel®, the mini-pleat media pack (used in such filters as the AAF VariCel® II and VariCel® M-Pak), and the V-Bank filter (such as the VariCel® VXL) were achieved by constructing the filter in a new way, arranging the media in the filter differently so as to reduce resistance to airflow.

In general, these advances extend the surface of the media, essentially adding more surface area for air to come in contact with as it flows through the filter. More media means both more fibers and more spaces between them available for air to flow, so this has two positive effects on energy consumption.

1. More spaces between fibers means air can more easily pass through the filter.
2. More fibers to collect passing dust means that the filter will last longer before becoming clogged and requiring replacement.

Combined, these effects reduce energy consumption over the life of the filter.

In many cases, end customers and even filter manufacturers are focused solely on reducing initial resistance, the resistance to airflow when the filter first goes into use. However, in many cases, poorly designed filters do not load dust evenly over their surface, and/or use substandard media that clogs easily. These filters will become loaded with dust more quickly and either will require frequent replacement or, if not replaced, will consume much more energy to draw sufficient air through. While having a lower initial resistance, these filters drastically increase the total cost to operate the filter as compared to better-designed, longer-lasting filters that may have slightly higher initial resistance.



Although Brand X had a lower initial resistance, the AAF 'equivalent' filter demonstrated a longer life and lower energy cost due to the superior configuration of the media and frame, even at the same efficiency.

Also note that in many cases filters using synthetic media will have a relatively low initial resistance for their respective MERV ratings. However, these MERV ratings are often achieved by using media that relies in part on an electrostatic charge to filter out small particulates. While such filters may work well for certain applications, note that they could lose efficiency as fibers become loaded with dust. Also, such filters tend to become dust-loaded more quickly than comparable ones that filter particles by mechanical means only.

Factors Impacting Total Cost of Ownership

Total Cost Analysis

The most significant cost normally affecting Total Cost of Filter Ownership is energy. However, other costs, such as the filter cost, installation, disposal, freight, procurement overhead, storage, and filter effectiveness in maintaining clean coils and ductwork to prevent ancillary maintenance costs, should also be considered in any total cost analysis.

For perspective, in a recent filter cost optimization study of a hospital, the annual energy cost was approximately 65% of the total cost of ownership, the filters represented approximately 25%, the other costs were approximately 10%, and the Price of Energy was only $0.067/kWh, while the National Commercial Average was $10.28/kWh.

Because energy is normally the most significant cost, an understanding of the factors that affect energy costs is particularly useful.
The Annual Filter Energy Cost factors can be simply shown in the following equations:

Annual Filter Energy Cost ($/year) =
Price of Energy ($/kWh) x Filtration Energy (kWh/year)

Where Filtration Energy is defined as:

$$\text{Filtration Energy (kWh)} = \frac{\text{(System Airflow (CFM) x Average Filter Pressure Drop (in. w.g.) x Cycle Time (yrs)}}{\text{Fan System Fractional Efficiency (0.00) x 8520}}$$

Where, equation units are:

kWh	=	kilowatt-hours
CFM	=	cubic feet per minute
in. w.g.	=	inches of water gauge
yrs	=	years
0.00	=	digital fraction, to convert digital fraction to %, then multiply by 100
8520	=	conversion factor

The **Factor Table** below shows the key relationship between the different variables in the above equations:

Approximately **50%** of a building's energy consumption goes to the heating, cooling, and moving of air

Energy costs up to **81% higher** in **facilities** with **deferred maintenance** issues

71% of this increase is **HVAC related**

Source: Department of Energy; 2006 Buildings Energy Data Book

Annual Filter Energy Cost ($/yr)		Cycle Time (yrs)		Price of Energy ($/kWh)		System Airflow (CFM)		Average Filter Pressure Drop (in. w.g.)		Fan System Efficiency (00.0)
Goes Down	with	Same	as	Goes Down	and/as	Goes Down	because	Goes Down	or as	Goes Up
Goes Up	with	Same	as	Goes Up	and/as	Goes Up	because	Goes Up	or as	Goes Down

Factor – Price of Energy ($/kWh)

The Retail Price of Energy can range in base rate from 0.04$/kWh to over 0.25$/kWh in different regions in the U.S. However, additional charges, such as customer charge, distribution, commodity charge, purchase energy adjustment, and state taxes added to the base rate will increase the electricity cost on a $/kWh basis. "Single Issue Ratemaking" surcharges for items like aging infrastructure, conservation, renewable resources, and storm damage, among other items, will also add to the electricity cost on a $/kWh basis. A fair, accurate assessment of the electricity cost is to divide the total bill by the number of kilowatt hours.

US Department of Energy	2013 Total Electric Industry – Average Retail Price (cents/kWh)	
State	Commercial	Industrial
New England	13.97	12.25
Middle Atlantic	13.06	7.27
East North Central	9.58	6.65
West North Central	8.98	6.67
South Atlantic	9.38	6.55
East South Central	9.81	5.98
West South Central	8.11	5.82
Mountain	9.35	6.48
Pacific Contiguous	12.57	8.13
Pacific Noncontiguous	25.49	26.08
U.S. Total	10.28	6.84

Factors Impacting Total Cost of Ownership

Factors – System Airflow (CFM) and Average Filter Pressure Drop (in. w.g.) – Filter Physics

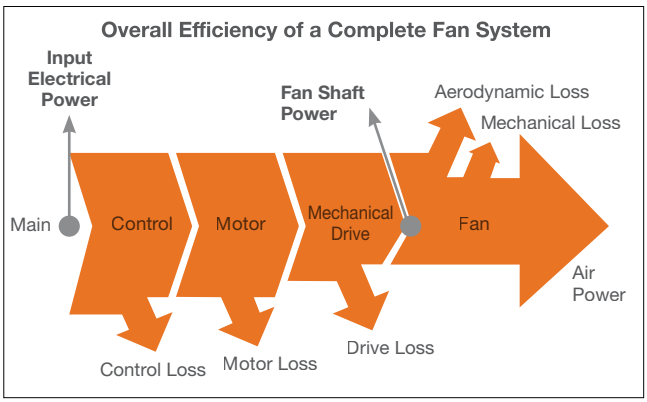
The System Airflow and the Average Filter Pressure Drop are interrelated through Filter Physics. As shown in the Factor Table, as the System Airflow increases, then so does the Filter Pressure Drop, and conversely, as the flow decreases, so does the pressure drop.

The Filter Dust Holding Capacity Test graphic shows the relationship between System Airflow (as velocity) and Filter Pressure Drop, where a filter was tested at 600, 500, 400, and 300 FPM velocities. Filter specifications for life cycle and recommended pressure changeout are normally for 500 FPM velocity. In practice, many filtration units operate at velocities in the 300 to 400 FPM range. At these velocities, the filters likely will not attain the manufacturer's recommended changeout pressure, based on 500 FPM. This could result in the filter being left in the filtration unit for an excessive period of time, likely wasting energy and possibly leading to issues like fungal growth.

Calculations for Annual Filter Energy Cost should compensate for the effect of the system velocity on initial filter pressure drop, recommended pressure drop, average filter pressure drop, and cycle time.

Factor – Fan System Fractional Efficiency

The Fan System Fractional Efficiency is a difficult value to determine because of the many variables in fan system design and operations, as shown in the figure below.

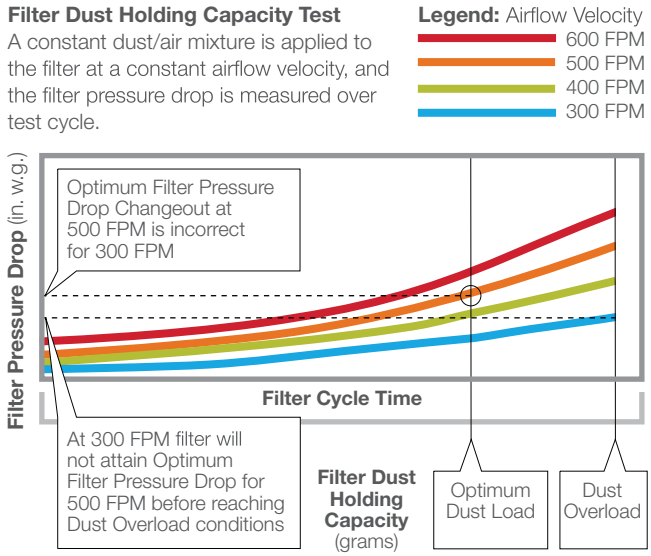


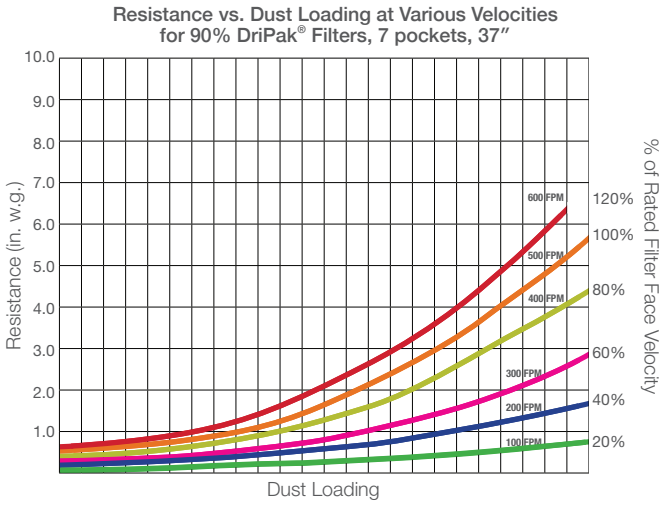
Fan system fractional efficiency values used in total cost of ownership and energy calculations can range from 0.20 to 0.70, dependent upon the type of fan and the actual airflow versus design. Many systems are designed for 500 ft/min velocity, but most operate between 200 and 350 ft/min. These turn-down velocities affect the fan system components as each falls in efficiency, especially the fan itself.

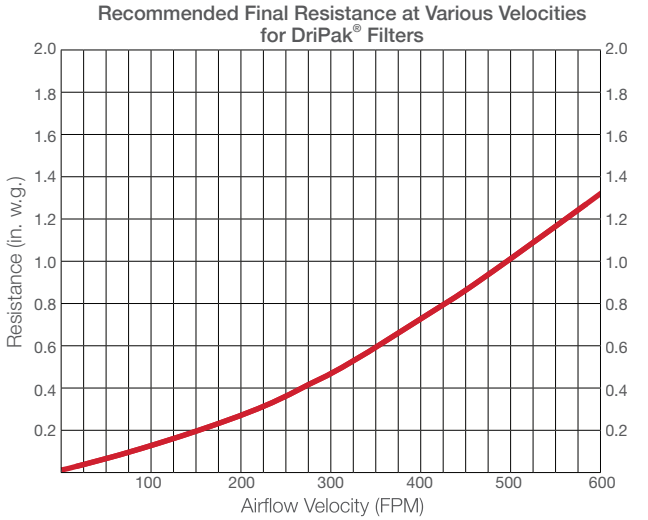
Published studies, as well as AAF field studies, show that typical fan system efficiencies in the range of 0.40 us appropriate for most energy use calculations.

Filter Dust Holding Capacity Test

A constant dust/air mixture is applied to the filter at a constant airflow velocity, and the filter pressure drop is measured over test cycle.







Factors Impacting Total Cost of Ownership

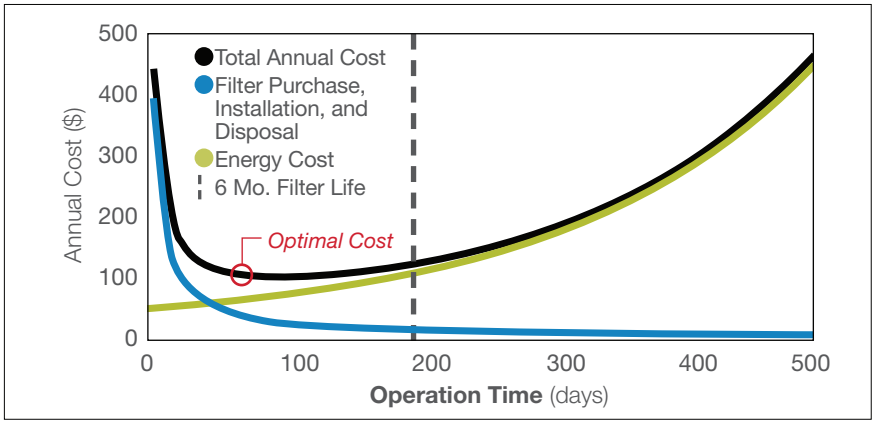
There are methods to directly determine the fan system fractional efficiency that allow for accurate values to be used in the total cost of ownership calculations. **Contact an AAF specialist for more information.**

Annual Filter Energy Cost ($/yr)		Cycle Time (yrs)		Price of Energy ($/kWh)	Annual Filter Energy Cost ($/yr) based Fan System Efficiency		
Assume	with	Assume	as	Assume	Low Efficiency 0.20	Assume Correct Efficiency 0.40	High Efficiency 0.60
$1,000/yr	with	Same	as	Same	$2,000	$1,000	$1,500

Annual Cost

Total Cost of Ownership (TCO) quantifies the cost of a purchase across the product's entire life cycle. Therefore, it offers a more accurate basis for determining the value – Cost vs. ROI – of an investment in air filters and their installation, rather than just considering the purchase price alone. The overall TCO includes direct and indirect expenses, as well as some intangible ones that can have monetary values assigned to them. When looking to improve your performance in this area, you should employ the expertise of an air filtration specialist who can provide professional guidance and analysis to help you optimize performance and lower your TCO.

Manufacturer's Recommended Changeout Resistance is often misunderstood. When systems were predominantly single speed fans and operated at 500 ft/min, the dust loading of 1.0 in. w.g. was a reasonable changeout recommendation. When VAV systems can modulate and average systems velocities are in the 200–300 ft/min range, the appropriate resistance changeout point is best determined using a total cost of ownership tool to fully account for energy, filter, installation, and disposal costs.



Also note that in many modern Variable Air Volume systems, airflows and pressures vary widely on a day-to-day basis, and average velocities over longer periods of time tend to change with the seasons. These complicating factors add additional complexity to predicting the optimal time to change filters.

Along with planned changeouts and filter recommendations through tools such as TCO Diagnostic®, use of a filter monitoring and optimization tool such as Sensor360® can account for this variability and adjust optimal changeout cycles accordingly, based on ongoing data collection. Such systems can also alert the user when conditions change and filters require changout urgently, as well as if air quality issues are detected.

Research shows that facilities with **poor IAQ** can expect **an overall daily productivity drop of around**

9%

with individual losses up to **33%**

—another factor in **return on investment**

15%–40%

of the lifetime ownership cost of an air handler unit (AHU) is directly attributable to the **air filters selected**

$

Sources: Staples Employee Study 2013; Presenteeism and productivity analysis; General Consulting Associates; Department of Energy; 2006 Buildings Energy Data Book

HVAC

FILTER SELECTION, STANDARDS & TESTING

Selecting the Proper Air Filter

Major Selection Factors

The most important element to consider in selecting the proper air filter is to meet the optimum air quality requirements of the facility, at the most favorable Total Cost of Ownership (TCO) possible. For example, healthcare regulations often mandate very specific filter efficiencies.

Other selection factors include:

- Consider the dimension of the tracks or frames that hold the filters within an existing installation; filters that fit the existing system will be available in various types of media and design that will directly affect the filter's pressure drop, dust holding capacity, efficiency, and price
- Utilize a TCO approach to normalize filter costs and energy costs associated with filter performance criteria like pressure drop and dust holding capacity, and note the impact of TCO against desired filter maintenance cycles, such as three, four, six, or twelve months
- Be aware of the opportunity to improve the IAQ of the facility, which has been shown to directly affect worker health and productivity, as well as the attentiveness of students and employees
- Be aware of the opportunity to reduce overall costs by using recently developed products that reduce energy costs
- Be aware of the high cost of deferred maintenance that can lead to unplanned expenses, safety risks, and system downtime
- Understand the role indoor air quality plays in occupant satisfaction, and that poor IAQ is one of the top tenant complaints
- Use a professional, technically capable air filtration specialist for guidance, and start by asking for an audit of the air filtration system

You should expect the following from an Air Filtration Audit:

- Analysis of your current state by a team of industry experts
- Professional guidance and analysis to reduce spend, decrease risk, and save time
- Valuable and detailed benchmark data
- Optimized TCO report that will show you where you could be performing better
- A standardized list of filters by air handler unit (AHU) and application

The Selection

Once the Air Filtration Audit is complete, review alternative recommendations for the filters, any recommendations to optimize your system, and the TCO information on each filter alternative. After consideration of all of these factors, you're ready to make the filter selection. Ask the air filtration specialist to check the installation at regular intervals to determine if the performance is as predicted.

There are

175,268

pages on IAQ

in the U.S. Code of Federal Regulations

Companies Choose AAF's Expertise Because of Our:

- Technical approach to problem solving
- Air Filtration Audits that provide professional guidance, insight, and analysis for cost savings and risk reduction
- TCO Diagnostic,® an HVAC filtration system analysis program, helps reduce deferred maintenance backlogs and decreases reactive time by analyzing system data, optimizing preventative maintenance schedules, and extending changeout cycles
- Broad range of filters for the optimal selection in each application

Source: Database of state indoor air quality laws, Environmental Law Institute, 2015; Code of Federal Regulations Total Pages and Volumes, Federal Register, 2015

Relevance of Fine Particulate Matter

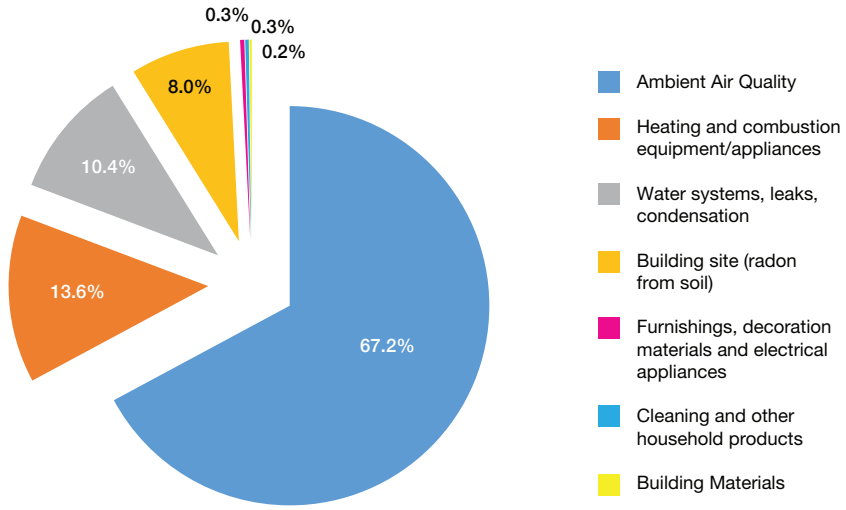
Outdoor air pollution plays a significant role in indoor air exposures. Due to ventilation providing continuous air exchange in buildings, the indoor air exposure to fine PM originates mostly from outdoor air, especially in areas affected by heavy traffic. The second most important source of exposure comes from the indoor combustion of solid fuels for cooking and heating (if present).

The outdoor air fine PM originates mostly from combustion sources, local and distant, in particular where the levels exceed rural background.

What is often not acknowledged is that in strongly polluted areas (e.g. heavy industry zones, city centers with heavy traffic) without air filtration, over 90% of ambient PM levels monitored outdoors, occurs indoors.

Applying correctly selected, efficient air filters in ventilation systems can significantly reduce the impact of PM exposure on the Burden of Disease (BoD).

Bad Ambient Air Quality Most Affects the Burden of Diseases (BoD)



Source: Eurovent 4/23-2017

Determining Recommended Filter Efficiency by Application and Typical Outdoor Air Quality

The table below helps you select air filters that ensure you meet requirements for the air inside your facilities based upon a combination of factors. By cross-referencing **your application** with the **typical quality levels of outdoor air**, you can determine the recommended minimum MERV rating for air filters in your application.

Application		Typical Outdoor Air Quality		
Commercial	General Ventilation	GOOD PM 2.5 10 PM 10 20	MODERATE PM 2.5 15 PM 10 30	UNHEALTHY PM 2.5 15 PM 10 30
High Hygenic Demand (pharma, hospitals, electronic industry, supply air in facilities with cleanrooms)	N/A	MERV 14	MERV 15	MERV 16
Medium Hygenic Demand (food and beverage production, etc.)	**Permanently Occupied** (schools, offices, hotels, residences, conference/exhibition halls, theaters)	MERV 13	MERV 14	MERV 15
Basic Hygenic Demand (less critical food and beverage production)	**Temporarily Occupied** (storage, server rooms, copier rooms)	MERV 11	MERV 12	MERV 13
No Hygenic Demand (automotive general production)	**Short-Term Occupancy** (restroom, stairways)	MERV 8	MERV 11	MERV 12
Heavy Industry Production Areas (steel mill, smealting, welding plants)	**Unoccupied** (garbage room, parking garage)	MERV 7	MERV 8	MERV 11

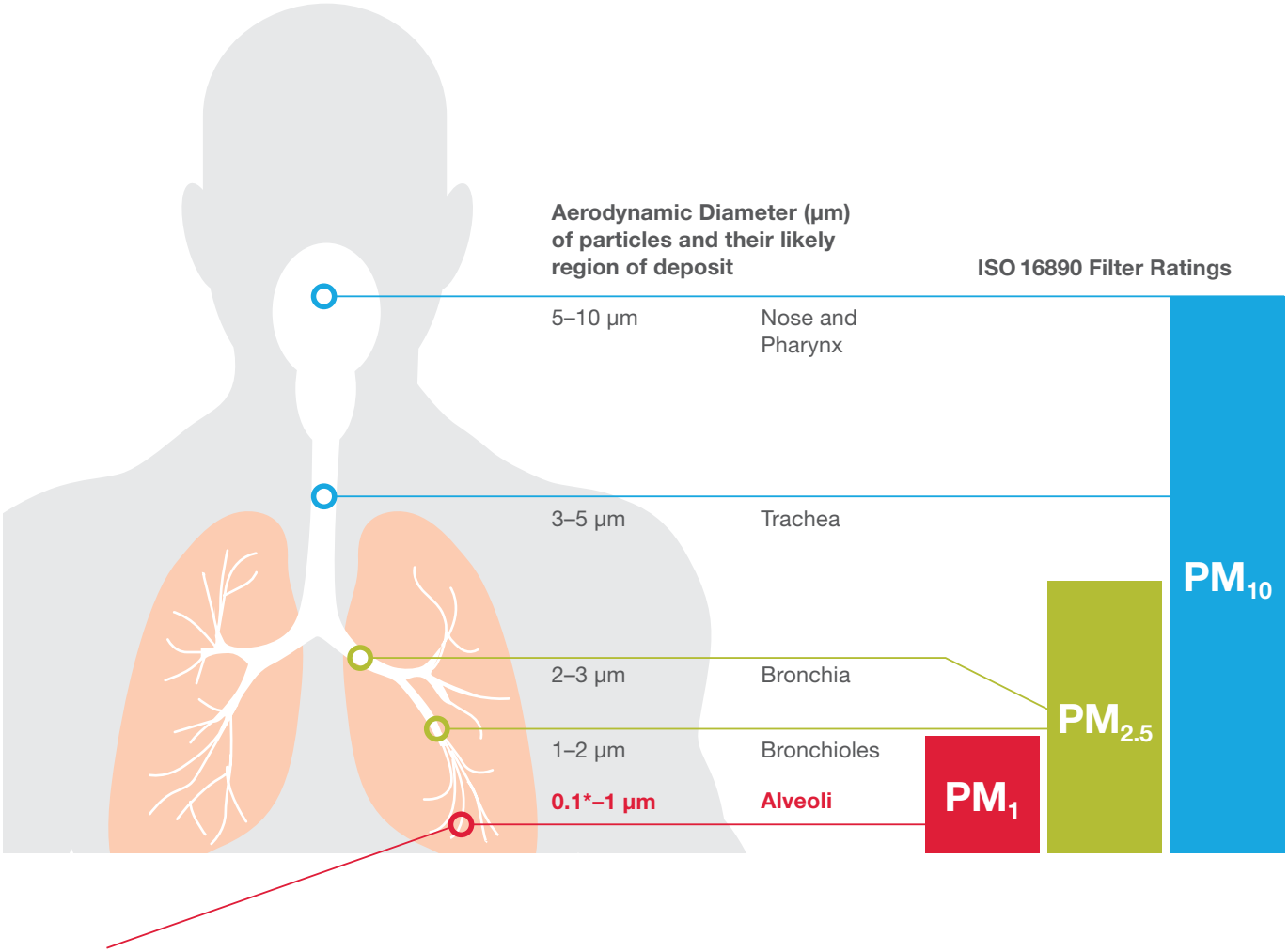
Given the speed at which Outdoor Air Quality can worsen due to wildfires and other unexpected events, we recommend exceeding the above efficiencies when feasible to ensure adequate protections if conditions worsen.

Minimum recommended filtration requirements above refer to final stage of filtration, ensure prefiltration is used as-recommended for the final filter chosen.

Based in part on EUROVENT 4/23/2017 "Selection of EN ISO 16890-rated air filter classes for general filtration applications" 1st Edition, published Jan. 9th, 2019.

Some countries may have national guidelines or industry-specific requirements that vary from the above.

Burden of Diseases (BoD)



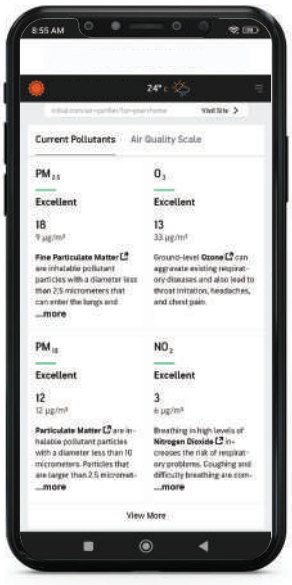
Small Particles Have Damaging Effects on Human Health

A variety of studies focus on the negative health impact of small particle pollution.

Conducted research determined an impact of IAQ on the burden of diseases (BoD). The burden of diseases is measured by the means of a so-called disability-adjusted-life-year (DALY). This time-based measure combines years of life lost due to premature mortality and years of life lost due to time lived in states of less than full health and was originally developed in 1990.

The total estimated burden of disease attributable to IAQ in the European Union is approximately 2 million DALYs per year, which means that two million years of healthy life is lost annually. It is worth noticing that, according to latest estimation carried out by French economists, the cost of 1 DALY can amount up to 100.000 EUR. On a global scale, losses resulting from an inadequate IAQ are large.

Source: Eurovent 4/23-2017



Information on small particle pollution is included in the air quality data of most weather apps.

ANSI/ASHRAE Standard 52.2

ASHRAE Standard 52.2 was originally released as a standard in 1999. This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC), which has established a documented program for regular publication of addenda or revisions. The most recent publication is ASHRAE Standard 52.2-2017. The title of the standard is:

"Method of Testing General Ventilation Air-Cleaning Devices for Removal *Efficiency* by Particle Size"

As the name implies, the standard provides a methodology for determining a filter's efficiency in removing various sizes of particles as the filter becomes loaded. The standard also measures the filter's resistance to airflow when clean. In 2008, the arrestance test and dust holding capacity (DHC) from ASHRAE Standard 52.1 were added to ASHRAE Standard 52.2.

Removal efficiency is calculated by counting the number of particles upstream and downstream of the filter through a range of particle sizes, detailed in the table below. The challenge aerosol is poly-dispersed solid-phase (dry) potassium chloride (KCl) particles generated from an aqueous solution. The removal efficiency is measured when the filter is clean and after each of 5 incremental dust loadings as the filter is loaded to its final resistance. Fractional efficiency curves are developed for the clean filter and after each dust loading. A composite minimum efficiency curve is developed, which reflects the lowest efficiency for each particle size from the 6 curves.

ASHRAE advances the arts and sciences of heating, ventilation, and air conditioning, with more than **53,000 members** from over **132 nations**

Source: ASHRAE www.ashrae.org

Range	Size Range Lower Limit (µm)	Size Range Upper Limit (µm)	Range Geometric Mean Particle Size (µm)
1	0.30	0.40	0.35
2	0.40	0.55	0.47
3	0.55	0.70	0.62
4	0.70	1.00	0.84
5	1.00	1.30	1.14
6	1.30	1.60	1.44
7	1.60	2.20	1.88
8	2.20	3.00	2.57
9	3.00	4.00	3.46
10	4.00	5.50	4.69
11	5.50	7.00	6.20
12	7.00	10.00	8.37

The composite minimum efficiency curve has all of the detailed data to make an appropriate filter selection. For example, if filters are being used to clean the air supplied to a paint booth where particles 4 micron and larger can cause a defect in the painted finish, filters that remove 100% of the particles in range 9 through range 12 when tested can be selected. However, to simplify the selection and specification of air filters, the test standard provides an "overall" reporting value of a 52.2 evaluated air filter expressed as the Minimum Efficiency Reporting Value (MERV).

MERV is a single number on a 16 point scale that is determined by placing the efficiencies of the 12 size ranges from the composite minimum efficiency curve into three larger groups as follows:

E1 = Ranges 1 to 4 (0.3 to 1.0 µm)

E2 = Ranges 5 to 8 (1.0 to 3.0 µm)

E3 = Ranges 9 to 12 (3.0 to 10 µm)

The efficiency for each group is arrived at by averaging the composite minimum efficiencies of the 4 ranges.

Range	Size	Group
1	0.30 to 0.40	E1
2	0.40 to 0.55	E1
3	0.55 to 0.70	E1
4	0.70 to 1.00	E1
5	1.00 to 1.30	E2
6	1.30 to 1.60	E2
7	1.60 to 2.20	E2
8	2.20 to 3.00	E2
9	3.00 to 4.00	E3
10	4.00 to 5.50	E3
11	5.50 to 7.00	E3
12	7.00 to 10.00	E3

ANSI/ASHRAE Standard 52.2

The average particle-size efficiency (PSE) for each group is referenced against the MERV parameters (see table below). Moving up from the bottom of the table, the MERV rating will be in the left hand column of the first row, where that PSE for each group generates a true statement. For example, if the PSE for Range 3 is 81%, and the PSE for Range 2 is 42%, the filter would be MERV 9 (Range 1 efficiency is not taken into consideration for MERV 9).

Minimum Efficiency Reporting Value (MERV) Parameters Table

Standard 52.2 Minimum Efficiency Reporting Value (MERV)	Composite Average Particle Size Efficiency, % in Size Range, µm			Average Arrestance, %
	Range 1 0.30-1.0	Range 2 1.0-3.0	Range 3 3.0-10.0	
1	N/A	N/A	$E_3 < 20$	$A_{avg} < 65$
2	N/A	N/A	$E_3 < 20$	$65 \leq A_{avg}$
3	N/A	N/A	$E_3 < 20$	$70 \leq A_{avg}$
4	N/A	N/A	$E_3 < 20$	$75 \leq A_{avg}$
5	N/A	N/A	$20 \leq E_3$	N/A
6	N/A	N/A	$35 \leq E_3$	N/A
7	N/A	N/A	$50 \leq E_3$	N/A
8	N/A	$20 \leq E_2$	$70 \leq E_3$	N/A
9	N/A	$35 \leq E_2$	$75 \leq E_3$	N/A
10	N/A	$50 \leq E_2$	$80 \leq E_3$	N/A
11	$20 \leq E_1$	$65 \leq E_2$	$85 \leq E_3$	N/A
12	$35 \leq E_1$	$80 \leq E_2$	$90 \leq E_3$	N/A
13	$50 \leq E_1$	$85 \leq E_2$	$90 \leq E_3$	N/A
14	$75 \leq E_1$	$90 \leq E_2$	$95 \leq E_3$	N/A
15	$85 \leq E_1$	$90 \leq E_2$	$95 \leq E_3$	N/A
16	$95 \leq E_1$	$95 \leq E_2$	$95 \leq E_3$	N/A

Filters that have a Range 3 value of less than 20% undergo an Arrestance test to establish the MERV.

The arrestance test is also useful for comparing filters, particularly those that are MERV 10 and less. The removal efficiency tests to establish MERV are conducted with a dry aerosol. Some filters show declining efficiency values in Range 3 as the particle size gets larger. This is because the larger dry KCl particles do not adhere as well to dry clean media. A filter's ability to stop and retain the large KCl particles does not necessarily translate into a greater ability to capture dirt. There are MERV 9 and 10 filters that have lower arrestance values (capture less dirt) than MERV 8 filters. It is a good idea to compare the arrestance values and dust holding capacity (DHC) of filters MERV 10 and below to ensure you are getting good filtration value.

Appendix J

There have been many studies globally that have demonstrated a loss in efficiency in some filters as they are exposed to sub-micron particles. Appendix J was added to ASHRAE Standard 52.2 in 2008 as a non-ANSI approved, optional conditioning step to provide a method of identification of the drop in efficiency. The reported value per Appendix J is referred to as MERV 'A'. Filters tested per Standard 52.2 with the Appendix J option have both a MERV and a MERV 'A.'

A motion at the ASHRAE meetings in New York City in 2014 to make appendix J a mandatory part of the standard was subsequently voted down. For the time being, it remains an optional appendix.

How to Read a Test Report

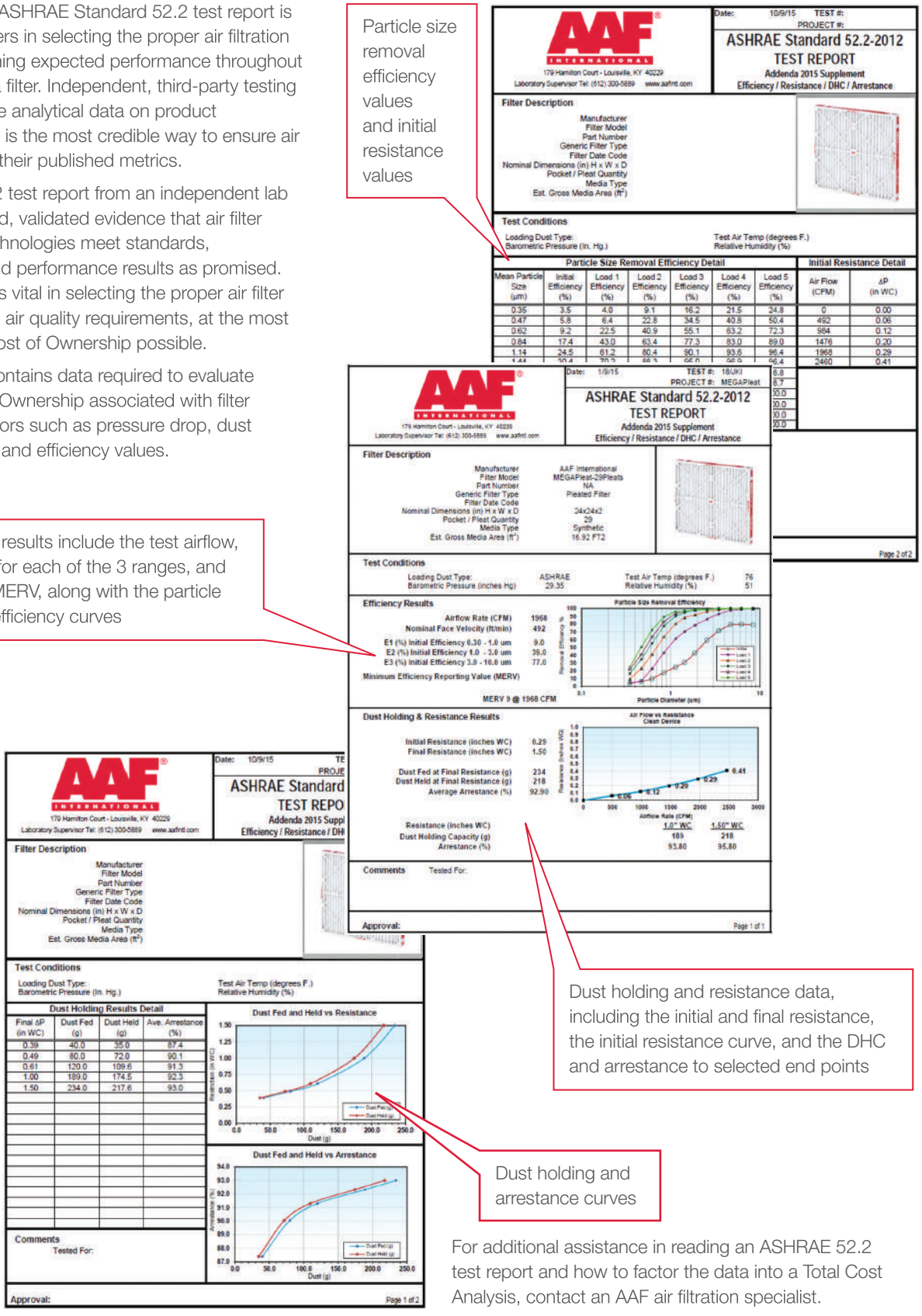
The intent of the ASHRAE Standard 52.2 test report is to assist customers in selecting the proper air filtration products by defining expected performance throughout the useful life of a filter. Independent, third-party testing provides objective analytical data on product performance and is the most credible way to ensure air filters perform to their published metrics.

An ASHRAE 52.2 test report from an independent lab provides unbiased, validated evidence that air filter products and technologies meet standards, specifications, and performance results as promised. This information is vital in selecting the proper air filter to meet optimum air quality requirements, at the most favorable Total Cost of Ownership possible.

The test report contains data required to evaluate the Total Cost of Ownership associated with filter performance factors such as pressure drop, dust holding capacity, and efficiency values.

Particle size removal efficiency values and initial resistance values

The efficiency results include the test airflow, the efficiency for each of the 3 ranges, and the resulting MERV, along with the particle size removal efficiency curves



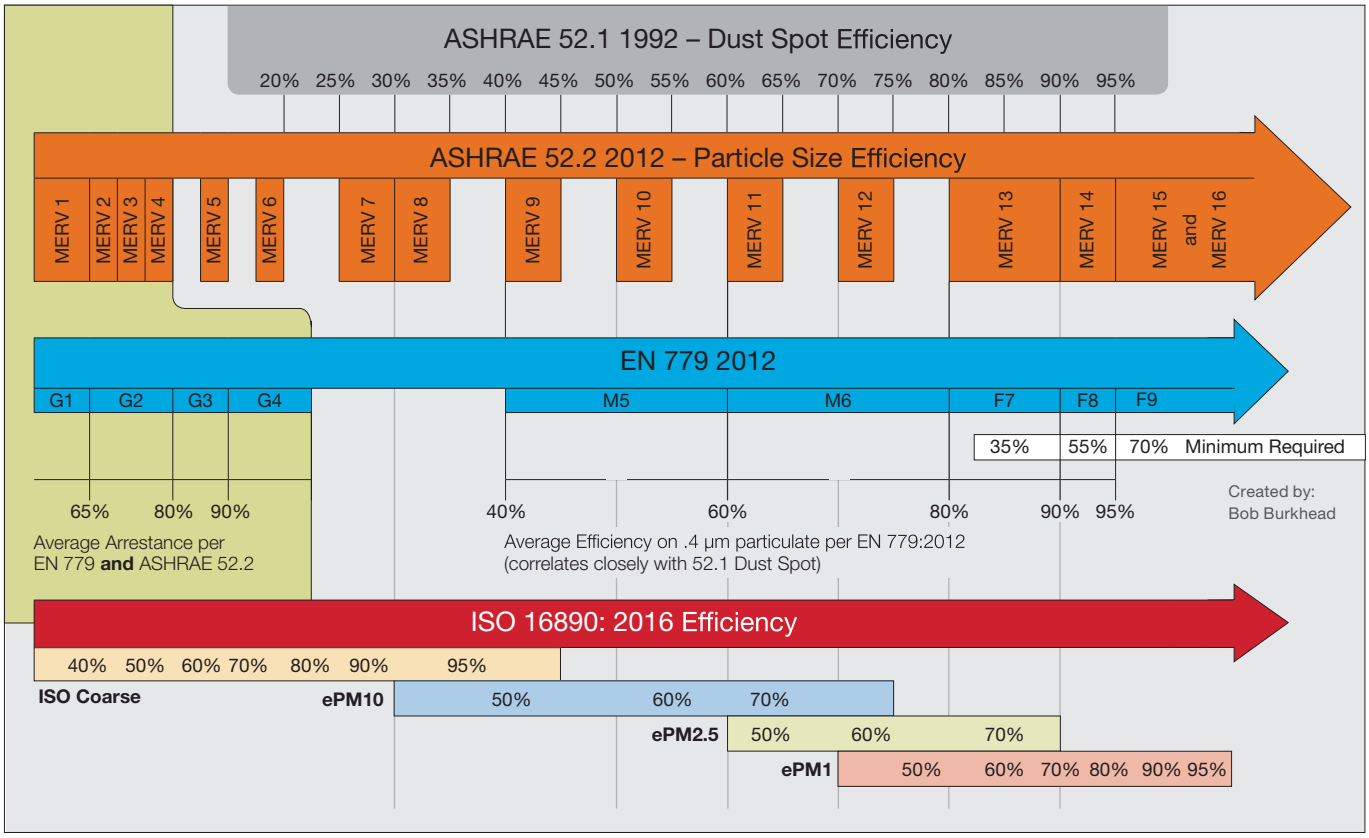
Dust holding and resistance data, including the initial and final resistance, the initial resistance curve, and the DHC and arrestance to selected end points

Dust holding and arrestance curves

For additional assistance in reading an ASHRAE 52.2 test report and how to factor the data into a Total Cost Analysis, contact an AAF air filtration specialist.

HVAC Filter Designations

Test Standard Correlations



The test standard correlations above are approximations based on results obtained on a sampling of products. Actual results on products may differ somewhat from these correlations, and a product tested to one standard that needs to meet the requirements of another standard should be tested in *accordance with the specified standard.*

Comparison of EN 779 and EN ISO 16890 Rated Filter Classes

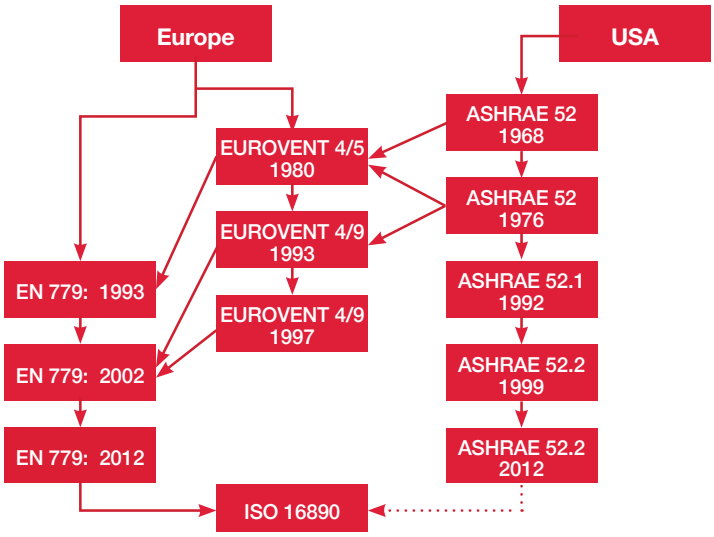
The direct conversion of EN 779 and EN ISO 16890 classes is not possible. To facilitate an indicative comparison, particularly for the purpose of replacing existing filters, the Eurovent Association has developed a table matching both EN 779 and EN ISO 16890 classes tested for the same filters.

The comparison shows the actual overlapping of EN 779 and EN ISO 16890 classes and was developed based on real test data of 91 filters provided by Eurovent Certita Certification.

ASHRAE 52.2	EN 779 2012	EN ISO 16890 – Range of Actual Measured Average Efficiencies		
Filter Class		ePM_1	$ePM_{2.5}$	ePM_{10}
MERV 10	M5	5% – 35%	10% – 45%	40% – 70%
MERV 11	M6	10% – 40%	20% – 50%	60% – 80%
MERV 13	F7	40% – 65%	65% – 75%	80% – 90%
MERV 14	F8	65% – 90%	75% – 95%	90% – 100%
MERV 15	F9	80% – 90%	85% – 95%	90% – 100%

EN 779 – EN ISO 16890 comparison courtesy of Eurovent.

History of HVAC Air Filter Standards



- **1968** ASHRAE published the first unified filter testing standard, measuring:

  – Arrestance

  – Efficiency via dust spot testing

  – Dust holding capacity

  This test was improved/revised as ASHRAE 52-76 and then as ASHRAE 52.1:1992, but the underlying methodology were largely unchanged until 1999.

- **1999** ASHRAE 52.2 replaced 52.1, most notably eliminating the Dust Spot test and replacing it with MERV ratings. Filter efficiency is now measured via particle counter against 12 particle sizes.

  European filter testing standards have followed a similar trajectory. The Eurovent 4/5 standard was developed in 1980 based on the ASHRAE 52-76 standard and was the first to classify filters into categories based on their efficiency. Eurovent 4/5 led to the development of the EN779 standard. The revised standard, Eurovent 4/10, was the first to measure efficiency via optical particle counters and classify via fractional efficiency. However, the EN779 standard, measuring only 0.4µm particles, was more widely used until 2018.

- **2018** EN779 has been replaced by ISO 16890, offering a rating system more clearly aimed at fractional efficiency, especially against fine particulates. See comparison below. Note: The U.S. continues to use the ASHRAE 52.2 Standard.

Comparison of Standards

Standard	ASHRAE 52.2: 2012	ISO 16890	EN 779: 2012
Aerosol	KCl	DEHS/KCL	DEHS
Aerosol Range	0.3 to 10.0 µm	DEHS: 0.3 to 1.0 µm KCL: 1.0 – 10 µm	0.4 µm
Particle Sizes for Rating	E1: 0.3 – 1.0 µm E2: 1.0 – 3.0 µm E3: 3.0 – 10.0 µm	PM1: 0.3 – 1.0 µm PM2.5: 0.3 – 2.5 µm PM10: 0.3 – 10 µm	0.4 µm
Loading Dust	ASHRAE 52.2 Dust	ISO Fine	ASHRAE 52.2 Dust
Conditioning	Optional: Appendix J (whole filter)	Mandatory: IPA Vapor (whole filter)	Mandatory: IPA Liquid (flat sheet)
Conditioning Substance	0.03 µm KCL	IPA Vapor	IPA Liquid
Conditioning Time	Efficiency measured after minimum increments of $6.4x10^7$ particles/cm^3 min. Conditioning stops after no further significant drop in efficiency.	24 h	2 min soak
Classification	MERV 4 – MERV 16	ePM1, ePM2.5, ePM10	G1 – G4, M5 – M6, F7 – F9
Rating	Worst case	Average of initial and discharged condition	Worst case

UL Filter Testing & Factory Mutual Approval

UL Standards

Underwriters Laboratories, Inc. (UL) is an agency that lists products they have tested against criteria deemed appropriate for public safety. For AAF's Commercial and Industrial filter product lines, the UL criteria are set forth in UL Standard 900.

Smoke and flammability limits for clean air filters are established with UL 900. However, the toxicity of products of combustion, which result from a filter's exposure to flame, is outside the scope of UL 900. The filter's filtration capability before or after flame exposure is also outside this scope.

To obtain a UL listing on a product, application is made to Underwriters Laboratories. Several samples are then submitted for test, and all of these samples must pass the criteria established successfully. The manufacturer further agrees to a follow-up service procedure, in order for the listing to be granted. A UL representative visits each point of manufacture during this procedure and selects at random a sample of the listed product. This sample is returned to UL for retest, ensuring continued compliance with the appropriate test critieria.

Only products which have met the criteria for listing may use the UL label. Products manufactured by AAF, which specifically do not bear the UL label, are not required by UL to comply with UL 900 requirements, even though they may be similar in appearance to other listed products.

Listings and Classifications for a company's products are published on the Underwriters Laboratories website in their Online Certifications Directory at www.ul.com.

AAF prints the above logo, as provided by Underwriters Laboratories, directly on our products, or on a product label, signifying the product is UL qualified. The logo is a registered trademark of Underwriters Laboratories.

Underwriters Laboratories (UL)
UL 900, Standard for Air Filter Units

UL 900 is a test standard that determines flammability and smoke characteristics on a clean air filter. Only filters that do not exceed the stated limits of flammability and smoke generation of UL Standard 900 can carry the UL symbol. All of AAF's HEPA/ULPA filters have been UL tested and are certified to meet the requirements of UL Standard 900.

A complete listing of AAF's products that are UL classified is available on UL's website on the Online Certifications Directory page at www.ul.com.

UL 586, Standard for High-Efficiency, Particulate, Air Filter Units

UL 586 is specific to HEPA filters and defines construction and minimum performance under various conditions. The conditions include:

- Low temperature test at 27°F (+/- 4°F)
- High humidity test with 90% RH (+/- 5%) at 77°F
- Heated air at 700°F (+/- 50°F)
- Spot flame test

Filters meeting the requirement of UL 586 can be labeled as such and are available in many of AAF's HEPA product lines, including AstroCel I and AstroCel II. This is a separate marking from the UL 900 mark.

CAN/ULC S111-13, Standard Method of Fire Tests for Air Filter Units

Many filters manufactured by AAF are also classified as meeting the requirements of CAN/ULC S111-13, Class 2. The test requirements are similar to those of UL 900, except that the filters are tested at their rated airflow and the standard approved by the Standard Council of Canada. According to CAN/ULC S111-13, a clean Class 2 unit burns moderately or emits moderate amounts of smoke when tested.

Factory Mutual Approval

Factory Mutual Approvals Standard 4920, Testing Filters Used in Clean Room Facilities

Most of AAF's mini-pleat HEPA/ULPA filters have been tested and approved to FM 4920. Its scope reads:

> ***1.2.1*** *This standard applies to filter assemblies for use in cleanroom facilities. The purpose of this standard is to test the filter assembly for the potential of flame spread and the amount of smoke being released during the Fire Exposure Test. The filter assembly typically consists of frames, filter media, gaskets, sealing gel material, and potting compounds.*

This standard does not concern the filter's ability to contaminate other filters during a fire situation.

Filters meeting the requirements of FM 4920 are labeled with appropriate FM markings. Verification of filters eligible for the FM approval label can be found at the FM Approvals website, www.approvalguide.com.

UL compliance with both Canadian and U.S. requirements.

Gas-Phase

FILTER SELECTION, STANDARDS & TESTING

History of Gas-Phase Filtration

History

The first documented use of activated carbon (commonly known as charcoal) can be traced back to around 3750 B.C., when it was first used by the Egyptians for smelting ores to create bronze. By 1500 B.C., the Egyptians had expanded its use to healing intestinal ailments, absorbing unpleasant odors, and for writing on papyrus. By 400 B.C., the Ancient Hindus and Phoenicians recognized the antiseptic properties of activated charcoal and began using it to purify their water.

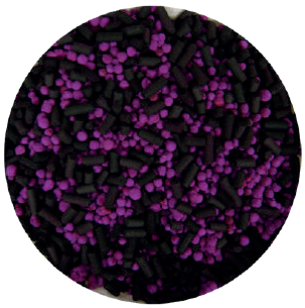
Between 400 B.C. and the 1800s, activated charcoal was used to remove odors from wounds, preserve water during ocean voyages, and by the military to treat battle wounds by removing toxins.

The earliest use of activated carbon for gas-phase contaminant removal dates back to 1854, when a Scottish chemist invented the first mask that utilized activated carbon to remove noxious gases. Wood was originally used as the base material for gas masks, since it was good at capturing poisonous gases when converted to activated carbon. By 1918, it was determined that shells and nuts converted to activated carbon performed even better than wood.

Around this same time, activated carbon began to be produced on a large scale, and its use spread to decolorization in the chemical and food industries. In the later 1900s, other industries such as corn and sugar refining, gas adsorption, alcoholic beverage production, and wastewater treatment plants began to use activated carbon.

Today, activated carbon is available in many different shapes and sizes, and its applications are growing every day. For air filtration, the most common types of activated carbon are granular activated carbon (GAC), pelletized activated carbon (PAC), and structured activated carbon. In addition, other substrates such as alumina and zeolite are used in lieu of activated carbon due to their tremendous pore structures. The most common applications of these different media types include corrosion control, odor control, and protection from toxic gases.

AAF's SAAFCarb Chemical Media



AAF's SAAFCarb GP Chemical Media

Gaseous Contaminant Guidance

What are Gaseous Contaminants?

Gaseous contaminants are undesirable airborne molecules mixed with the normal molecular oxygen and nitrogen in the atmosphere. Because of their molecular size, in the sub-nano range, they are not visible. Also not visible, but present in the air, is desirable molecular water, which is referred to as humidity. Some common offensive undesirable gaseous contaminants are hydrogen sulfide, the rotten egg smell, or skatole, the dirty diaper smell. Many gases that evolve from combustion are considered to be contaminants, such as carbon monoxide, oxides of nitrogen, oxides of sulfur, and polyaromatic hydrocarbons.

Size – Gaseous and Particulate Contaminants

The graphic in Figure 1 illustrates the relative size differences of airborne contaminants. Some particulate contaminants, such as viruses and bacteria, although not visible, have a mass size large enough to be filtered with specialized particulate filters. Gaseous contaminants can only be effectively removed using molecular gas-phase filtration technologies.

Types and Sources of Gaseous Contaminants

Gaseous contaminants are generally classified as Odorous, Corrosive, or Harmful/Toxic. Examples of their sources are shown in Figure 2.

Control of Gaseous Contaminants

The principle of specialized gas-phase filtrations systems, as seen in Figure 3, most often in combination with particulate filters, are used to remove molecular gaseous contaminants.

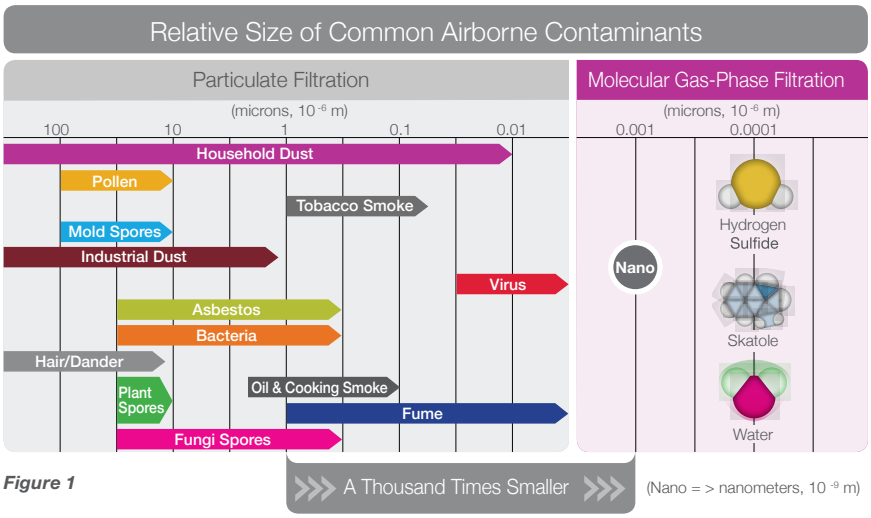


Figure 1

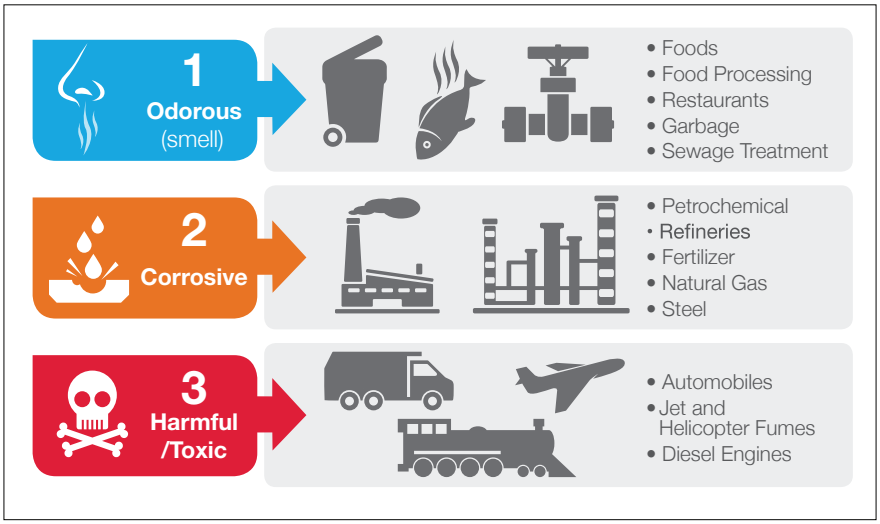


Figure 2

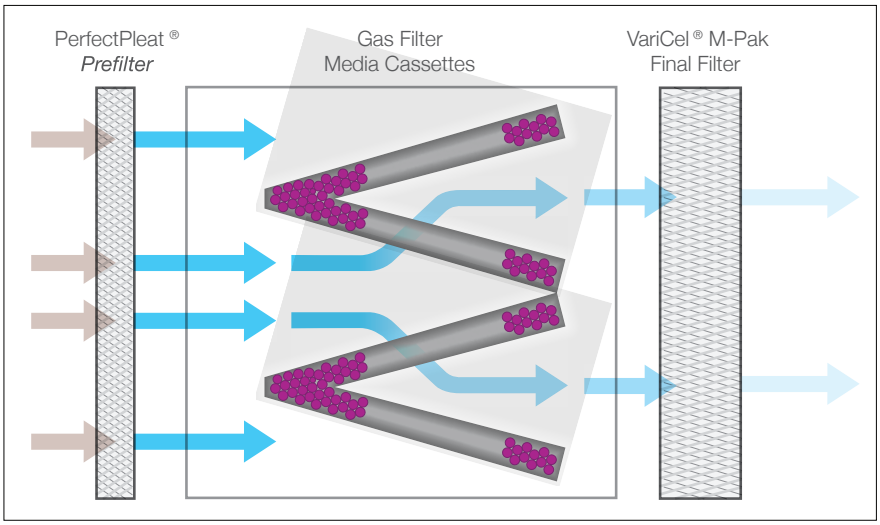


Figure 3

Selecting Gas-Phase Air Filters

Choosing the correct chemical media type and the correct chemical media delivery product is a daunting task. There is a lot of information that must be gathered first, such as the contaminants of concern (COC), the concentrations of the COC, the air volume, the desired media life, and the space available as examples. A good starting point is to complete an application questionnaire like the one below to document as much of this information as possible.

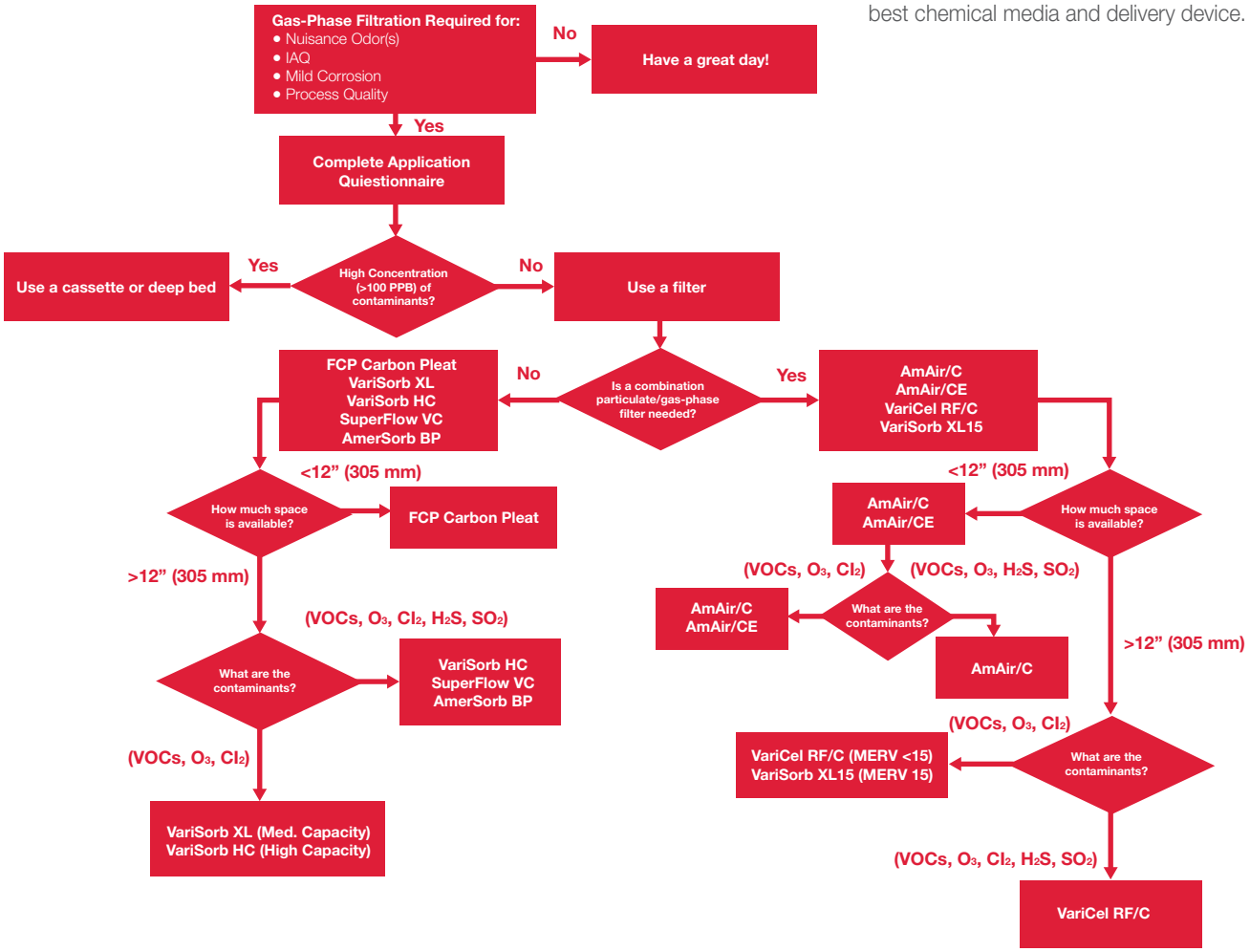
Application Questionnaire

1	What is the size of the space to be protected?	Height (ft)	10	Width (ft)	15	Length (ft)	20	Volume (ft³) 3000
2	What is the airflow that is required?	Airflow (ft³/min)		2000				
3	What contaminants are present and in what concentration?	Contaminant		Peak Concentration (ppb)		Average Concentration (ppb)		
		acetaldehyde		25		1		
		formaldehyde		125		5		
		nitric acid		300		12		
		nitrogen dioxide		575		23		
		sulfur dioxide		125		5		
		voc		525		21		
4	What are the operation times?		Hours/Day	Days/Week	Weeks/Year			
		Average	23.5	7	52			
		Peak	0.5	7	52			
5	Are there any dimensional constraints?	Max Height (ft)	10	Max Width (ft)	10	Max Length (ft)	10	
6	How many passes of media can be used (1, 2, 3 or 4)?	2						
7	What is the desired media life in months?	6						
8	What are the performance requirements? (electrical/electronic corrosion protection, ISA G1 environment, odor control, etc.)	Odor Control						
	Notes							

This gathering of the data is the first step in determining the correct type of media. In most applications, there is one chemical media type that will work best. There are times, however, when more than one media type will work. In other cases, more than one media type is required as part of a comprehensive solution due to the list of contaminants that need to be removed.

To further complicate matters, there are multiple chemical media delivery devices available, and most of the time, more than one of those devices will work. The amount of space that is available, along with the number of media types required, are the two main factors that determine which delivery device will best serve the application at hand.

Due to this complexity, it is recommended that you reach out to your local AAF representative to assist you with making the proper selection. The sample flowchart below shows the various decision points and steps that are required to select the best chemical media and delivery device.



Gas-Phase Standards

Standards

As the methods and uses of gas-phase air-cleaning grew and diversified, the air filtration industry recognized the need to establish standards for measuring performance and efficiency within gas-phase applications. The table below provides at-a-glance information on some of these standards that are commonly used.

STANDARD	PURPOSE	CONDITIONS
ASHRAE Standard 145.1 Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Loose Granular Media (ANSI Approved)	Compare gas-phase media options	Elevated gas challenge concentrations that exceed those in typical applications
ASHRAE Standard 145.2-2016 Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Air Cleaning Devices	Compare gas-phase device options	Elevated gas challenge concentrations that exceed those in typical applications but mimic the mix of contaminants and/or gases in these applications
ASHRAE Guideline 27P Measurement Procedures for Gaseous Contaminants in Commercial Buildings	Plan and implement measurement and sampling of gaseous contaminants	Actual conditions in live commercial building applications
ASTM D6646 Standard Test Method for Determination of the Accelerated Hydrogen Sulfide Breakthrough Capacity of Granular and Pelletized Activated Carbon	Establish relative breakthrough performance of activated carbon in granular or pelletized form in terms of removal of hydrogen sulfide	Elevated challenge concentration and humidified gas stream that does not simulate actual conditions in typical applications
ISO 10121-1:2014 Test Method for Assessing the Performance of Gas-Phase Air Cleaning Media and Devices for General Ventilation – Part 1: Gas-Phase Air Cleaning Media	Compare gas-phase media options	Elevated gas challenge concentrations that exceed those in typical applications
IEST-RP-CC008 High-Efficiency Gas-Phase Adsorber Cells	Specify suggested design and testing of modular gas-phase adsorber cells in single-pass or recirculating air cleaning systems	Applications that require high-efficiency removal of gaseous contaminants

Please refer to the Gas-Phase Testing information in the next section for additional details.

Gas-Phase Testing

ASHRAE Standard 145.1

Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Loose Granular Media (ANSI Approved)

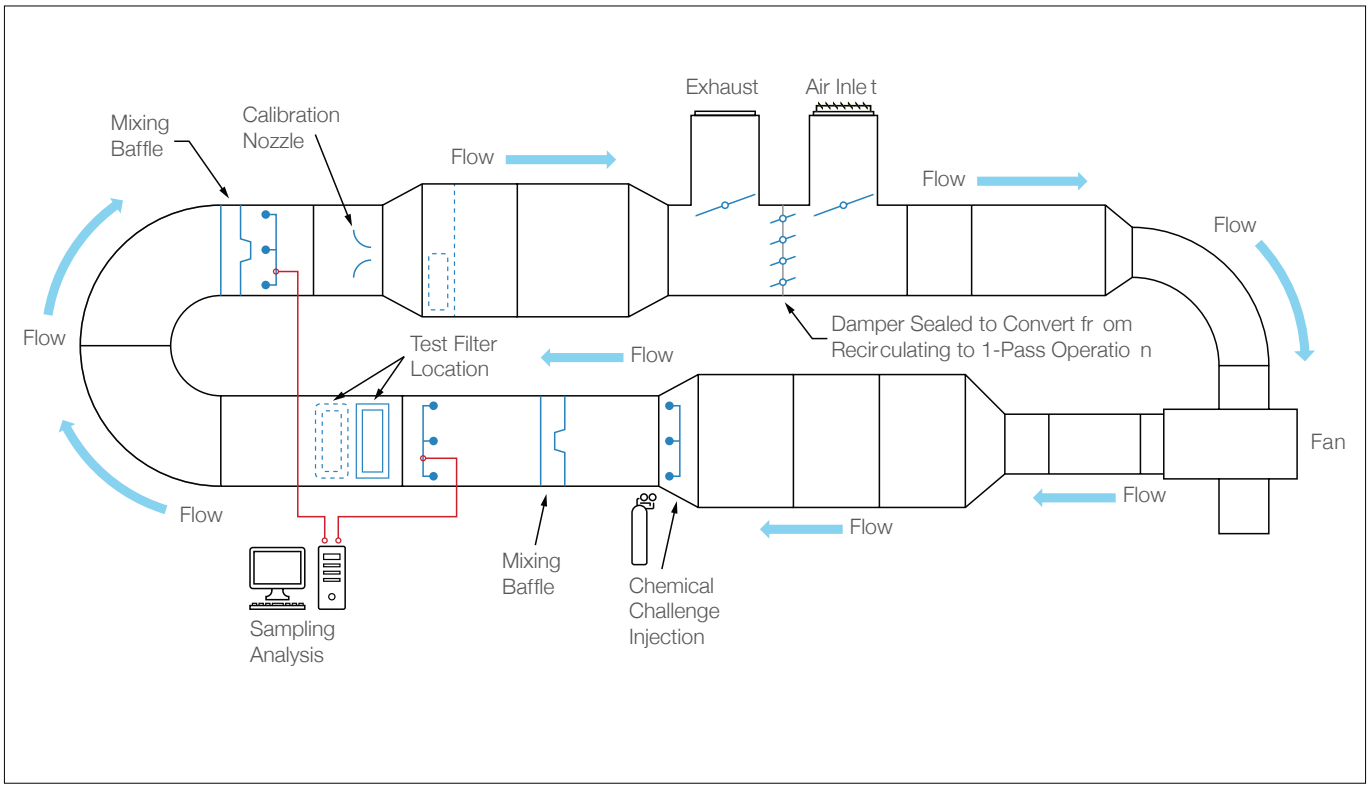
The purpose of this standard is to provide a standard laboratory test method for assessing the performance of loose granular media used in gas-phase air-cleaning systems. The standard details a small-scale laboratory test method for measuring the contaminant removal efficiency of loose granular sorptive media used in gas-phase air-cleaning equipment as installed in a test apparatus in an airstream challenged with test gases under steady-state conditions. The testing is conducted at elevated gas challenge concentrations relative to actual applications, and this testing should therefore be used to compare media rather than directly predict the performance in a particular application.

ASHRAE Standard 145.2-2016

Laboratory Test Method for Assessing the Performance of Gas-Phase Air Cleaning Systems: Air Cleaning Devices

The purpose of this standard is to provide a standard laboratory test method for assessing the performance of in-duct sorptive media gas-phase air-cleaning devices. The standard details a small-scale laboratory test method for measuring the contaminant removal efficiency of loose granular sorptive media used in gas-phase air-cleaning equipment as installed in a test apparatus in an airstream challenged with test gases under steady-state conditions. The testing is conducted at elevated gas challenge concentrations relative to actual applications, and therefore this testing should be used to quantify the performance of air cleaning devices for removing one or more specified gaseous contaminants or gas mixtures intended to simulate operation during service life.

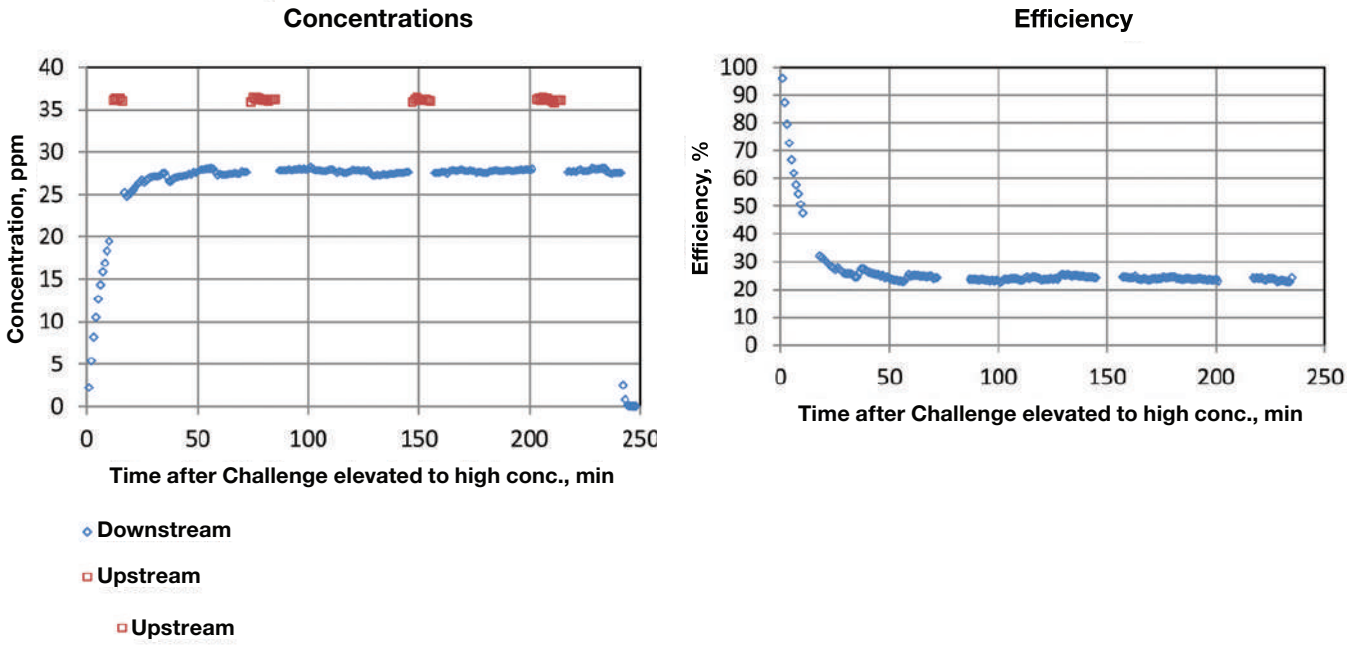
Laboratory Test Method for Assessing the Performance of Gas-Phase Air-Cleaning Systems: Air Cleaning Devices



Source: ASHRAE

Gas-Phase Testing

Example of Test Report: Capacity Test Results



ASHRAE Guideline 27P

Measurement Procedures for Gaseous Contaminants in Commercial Buildings

The purpose of this guideline is to assist engineers and other professionals with planning and implementing the measurement and sampling of gaseous contaminants in commercial buildings.

ASTM D6646

Standard Test Method for Determination of the Accelerated Hydrogen Sulfide Breakthrough Capacity of Granular and Pelletized Activated Carbon

This test method is intended to evaluate the performance of virgin, newly impregnated or in-service, granular or pelletized activated carbon for the removal of hydrogen sulfide from an air stream, under laboratory test conditions. The method determines the relative breakthrough performance of activated carbon for removing hydrogen sulfide from a humidified gas stream. This test does not simulate actual conditions encountered in an odor control application, and it therefore is meant only to compare the hydrogen sulfide breakthrough capacities of different carbons under the conditions of the laboratory test.

ISO 10121-1:2014

Test Method for Assessing the Performance of Gas-Phase Air Cleaning Media and Devices for General Ventilation -- Part 1: Gas-Phase Air Cleaning Media

This standard provides an objective laboratory test method, a suggested apparatus, normative test sections, and normative tests for evaluation of three different solid gas-phase air cleaning media (GPACM) or GPACM configurations for use in gas-phase air cleaning devices intended for general filtration applications.

IEST-RP-CC008

High-Efficiency Gas-Phase Adsorber Cells

This Recommended Practice (RP) covers the design and testing of modular gas-phase adsorber cells in single-pass or recirculating air-cleaning systems where the need for high-efficiency removal of gaseous contaminants is a requirement.

Technology and Services

Clean Air University

Clean Air University hosted by AAF

In keeping with our vision of "Bringing clean air to life," AAF offers university-style classroom training at our Clean Air Center (CAC), our research & development facility in Jeffersonville, IN, across the Ohio River from Louisville, KY. The training deepens the knowledge base of our employees and customers on the advantages of AAF's differentiated products and technologies. Through the course of these sessions, we also discuss science-based solutions that maximize indoor air quality (IAQ) at the lowest possible total cost of ownership (TCO) within real-world applications.

AAF begins this progressive training program with a preliminary training event on the Principles of Air Filtration, Product Applications, and Strategic Selling Techniques. Upon completion of this material, Clean Air University curriculum escalates to additional technically-based classes.

Advanced classes combine a mix of classroom and hands-on training. One track covers subjects such as cleanroom testing, standards, and design, as well as the measures and controls associated with air filtration in Life Sciences, Microelectronics, Containment, and Healthcare applications. Throughout these sessions, we explain how our solutions help mitigate risks inherent in these critical environments. Another track features modules on the appropriate use of ASHRAE products in commercial and industrial applications, including data collection from an actual air handling unit (AHU), the selection of the correct filter for an application, and the determination of an optimized filter changeout cycle.

Examples of Clean Air University experiential training:

- Using real-world scenarios to construct a Report of Findings based on a facility audit
- Presenting Total Cost of Ownership Diagnostic (TCOD)-based findings that mimic the applications of potential clients
- Installing and setting up Sensor360® in an air duct
- Designing and modeling different ISO-classified cleanrooms based on changing customer requirements and environmental conditions
- Installing, disposing, and aerosol testing of a HEPA filter in a mock cleanroom environment

Clean Air University attendees exit the program and return to the field with enhanced understanding thanks to education and hands-on training experiences based on real-world environments.

Clean Air University
LIVE & ONLINE LEARNING

★2022★
CLEAN AIR UNIVERSITY

Clean Air Innovation & Research Center

Opened in September 2016, the AAF Clean Air Innovation and Research Center (Clean AIR Center) represents a significant advancement in research and development efforts for the entire global air filtration industry. For nearly 100 years, AAF has been innovating solutions that bring clean air to life, and the Clean AIR Center ensures that we will remain the industry leader for decades to come. This $5.4 million, 39,000-square foot facility offers unrivaled capabilities and technology, ensuring that every filter we produce is backed by advances in every component of the filter, and in every phase of its design and production. Ultimately, this means that we produce products fine-tuned to deliver the highest quality and lowest total cost of ownership for our customers.

Creating New Possibilities

The way that many organizations approach research and development is a top-down method, where a select few determine the products and product direction. This approach limits the bandwidth of products and ideas. AAF's Global R&D team exercises a bottom-up approach to product development. This approach encourages ideas to flow from customers throughout the product development process, while also spurring collaboration with multiple business units.

The key to continue AAF's forward progress in the industry is to not only retain our current products and development processes, but to also create disruptive technologies for the air filtration industry. The standard industry approach is to take a current product and upgrade it with additional features and benefits. The Clean AIR Center utilizes this approach, but also enhances the product offering by targeting disruptive products and technologies that will transform how customers view and integrate with air filtration.

Bringing Clean Air to Life®

AAF's Global R&D team creates open lines of communication to all regions and customers to support an active and fluid product pipeline, and to deliver key innovative products and processes throughout the world. With this seamless and synergistic communication, as well as continued product innovation, our team will maintain AAF's position as the number one global air filtration company. The Global R&D team will achieve success in every aspect of product formulation, encompassing design, performance, and customer-focused innovation.

Clean Air Innovation & Research Center – Lab Services

The following are some of the lab services offered at the Clean AIR Center:

Filter Testing

Our test ducts meet or exceed all industry standards and can test via all common protocols. We regularly perform the full range of filters tests as per ASHRAE (including Appendix J), ISO, UL 9000, and other standards. These in-house capabilities mean that every new AAF filter design undergoes rigorous testing before release to ensure optimised performace. All existing products face periodic retesting to make certain that they continue to meet our high standards. Additionaly, we use these ducts to perform end-of-life tests of filters from the field. When combined with our advanced Total Costs of Ownership Diagnostic modeling software, we factor in the conditions experienced by the filter to determine the best possible solution for ar customer's specific application.

Media Lab

In our Media and Materials laboratory, we test, specify, and design the most crucial component of the filter-the media. We employ state-of-the-art analytical techniques so that each filter delivers superior performance. Starting with theoretical modeling, we then work with our partners to prototype exclusive media formulations. Next, we test and qualify the performance parameters of every potential new media before developing prototype filter designs with that superior media at their core. Our GIGABOT 3D printers five us the capability to go from concept to prototype in mere hours, and we can then test the resulting prototypes in our on-site ASHRAE test ducts. This unparalleled ability to fully prototype in-house enables an agile and accurate response to rapidly changing industry demands. Even better, it means that every new design we produce has gone through a multi-stage, rigorous testing process, typically with multiple designs iterations to ensure only the best possible design is produced and released to our customers.

However, our capabilities don't stop at just media and filter design development. We also have made significant investments in advanced technology to, once again, be able to find and recommend the best solution for every application. Filters submitted by customers can be examined with using FTIR and EDX Spectroscopy and viewed under our 20,000X magnification scanning electron microscope. This technology allows us to determine the exact type and concentration of all the various contaminants present within a customer's application, so that can recommend the perfectly tailored solution.

Biossafety Lab

The CAC also features a Biological Safety Level 2 (BSL-2) laboratory with microbiological and molecular biological testing capabilities. This lab allows AAF to perform viral efficacy testing for PRRS, PED, and Influenza A, which is crucial to our customers in the agriculture industry. Our ability to make rapid quantitative assessments for viral load using real-time PCR technology provides our customers with actionable information on, and protection from, the biological and viral agents that threaten their most crucial assets.

Air Filtration Audit

Extensive Studies Show:

- 34% of American workers feel that **poor IAQ had caused them to miss work**
- 50% or more of **energy spending** is related to moving air
- 80% of Americans rate clean air as a **very important priority**—up from 75% in 2012
- 88% of facility managers say that **deferred maintenance is an issue at their facility**
- The system most affected by deferred maintenance is **HVAC**
- There are **175,268 pages on IAQ** in the U.S. Code of Federal Regulations
- 56% of commercial maintenance teams *actually admit that* their **IAQ maintenance is not carried out per IAQ guidelines**

Sources: The real cost of poor IAQ; Gallup Environmental Poll, Gallup, 2015; Deferred Maintenance, Facilities.net, 2015; Database of state indoor air quality laws, Environmental Law Institute, 2015; Perceptions in the U.S. building industry of the benefits and costs of improving indoor air quality, M. Hamilton et al, 2015

Improper Air Filtration = Higher Energy Costs

Air filtration and maintaining healthy Indoor Air Quality (IAQ) levels are only a couple of the many different operational functions for which companies are responsible. And due to deferred maintenance, the significant impact of HVAC and filtration-related decisions can often be overlooked. But in-depth analysis of current preventative maintenance schedules, procedures, and products can pay off in a significant way for Facility Management teams by indicating the optimal filtration system that will save them both time and money.

Considering the above, it is essential that Executives and Facility Management teams have a trusted advisor to support them in the optimal selection and operation of their air filtration systems.

Have Concerns About Your Energy Spend? Here is Where We Can Start:

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 exactly how you compare to the best practices of companies that are similar to you. We strive to understand your current state and identify how you can perform even better.

Our mission is to utilize our core skill sets and products to aid you in protecting your environment, reducing your overall risk, and optimizing your filter-related spending. We will always invest our time and expertise to help you improve your business, not just to sell you a product.

5 Benefits You Will Receive From an Air Filter Audit:

1. Analysis of your current state by a team of industry experts
2. Professional guidance and analysis to reduce your energy spend, decrease your risk, and save you time
3. Valuable and detailed benchmark data
4. TCO Diagnostic® report which will show you where you could be performing even better
5. An optimized preventative maintenance schedule, including a standardized list of filters by air handler unit (AHU) and application

While the value of this audit is worth thousands of dollars, it is currently being offered at no charge and could give you significant benefits by helping you save money, reduce risk, and gain time.

TCO Diagnostic

Extensive Studies Show:

- **88%** of facility managers say that **deferred maintenance is an issue**
- **$5 million** – annual facility **cost of deferred maintenance**
- **HVAC**—the system **most affected by deferred maintenance**
- Approximately **50% of a building's energy consumption** goes to the heating, cooling, and moving of air
- Up to **37% more energy is consumed** by AHUs with **dirty coils** vs. clean coils
- 56% of commercial maintenance teams *actually admit* that their **IAQ maintenance is not carried out per IAQ guidelines**
- Facilities with poor IAQ can expect an overall **daily productivity drop** of around 9% with individual losses **up to 33%**

Sources: Department of Energy, 2006 Buildings Energy Data Book; The real cost of poor IAQ; The effects of indoor air quality on performance and productivity, D.P. Wyon, 2004; 90 percent of people show up to work sick, Staples Employee Study, 2013

The High Cost of Deferred Maintenance

Today's competitive business landscape is becoming increasingly complex and competitive, which means everyone must do "more with less." Unfortunately, this culture is wreaking havoc on facilities in the form of deferred maintenance. By reacting to issues, rather than preventing them, even the smallest delays can add up to exorbitant costs due to:

- Equipment failure
- Safety risks and insurance claims
- Facility disrepair
- Energy overspending

HVAC—The System Most Affected by Deferred Maintenance

When HVAC systems are not maintained on time or as planned, they do not perform as they should, costing you time and money. Energy costs are up to 81% higher in facilities with deferred maintenance. 71% of this increase is HVAC related. With half of a facility's energy costs attributed to heating, cooling, and moving air, proper filter maintenance is essential to keeping HVAC systems operating effectively and efficiently. The proper selection of air filters is critical to a system's performance and can extend the life of components, decrease energy spend, and reduce labor costs.

Optimize Preventative Maintenance Schedules & Total Cost of Ownership

Filters play an important role in reducing your deferred maintenance backlog, so having an optimized program for filter maintenance and replacement is vital to a facility's operations. TCO Diagnostic® is an HVAC filtration system analysis program that helps reduce deferred maintenance backlogs and decrease reactive time by analyzing each facility's HVAC data, optimizing preventative maintenance schedules, and extending changeout cycles at the lowest total cost of ownership. This tool provides a complete optimization of your filtration system to determine the most effective and efficient filter selection based on your facility's needs, saving you time and money while reducing risk.

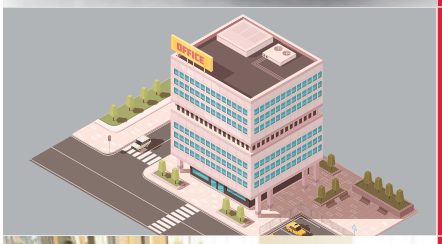
Sensors and Internet of Things (IoT)

Definition:

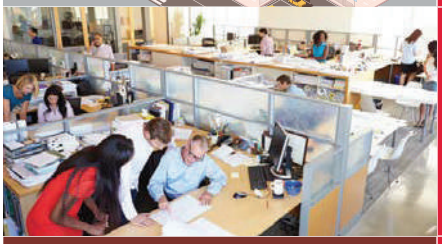
Machine-to-machine communication that is built on cloud computing and networks of data-gathering sensors with mobile, virtual, and instantaneous connection.

5th Generation

1G: Protection of HVAC Equipment



2G: Protection of Downstream Assets



3G: Protection of People (IAQ)

4G: Making the Invisible Visible® (IoT)

5G: AAF Connect

How to Optimize Your Change-Out Cycle?

On the Clock/Calendar method often results in replacing filters that are still relatively clean, wasting time and money.

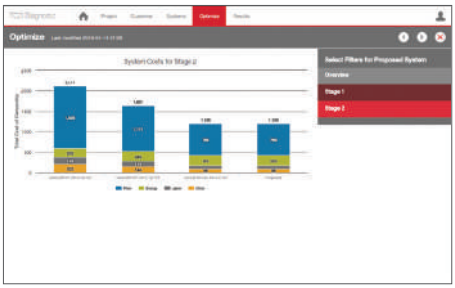
On the Pressure Gauge method requires regular pressure gauge monitoring, frequent gauge maintenance and record-keeping, and adjustments based on airspeed to be effective.

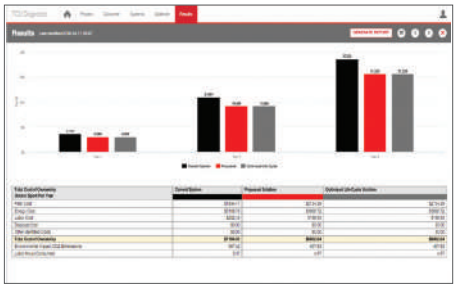
On the Money method allows data-driven approach to changeout cycles based upon intelligent, Internet-connected sensors. Change filters only as necessary at the time that offers the lowest possible combination of materials, labor, and energy costs.

Sensors and Internet of Things (IoT)

Multiple Assumptions Made in Current Calculations of TCO by ALL Filter Companies

- Outside Contamination
- Airflow
- Filter Efficiency
- Change Based on Final PD
- Change Based on PM
- Estimated Average DP





IoT and Air Filtration – Sensor Technology

Placement of sensors, at a minimum, to measure and monitor:

- Outside air quality
- Upstream air quality
- Downstream air quality ➔ IAQ
- Differential pressure ➔ Energy usage
- Dashboard & Mobile View

Real-time data that allows optimization of:

- Intelligent air filter selection
- Intelligent air filter change-outs
- Indoor air quality (IAQ)
- Energy usage
- Filter efficiency

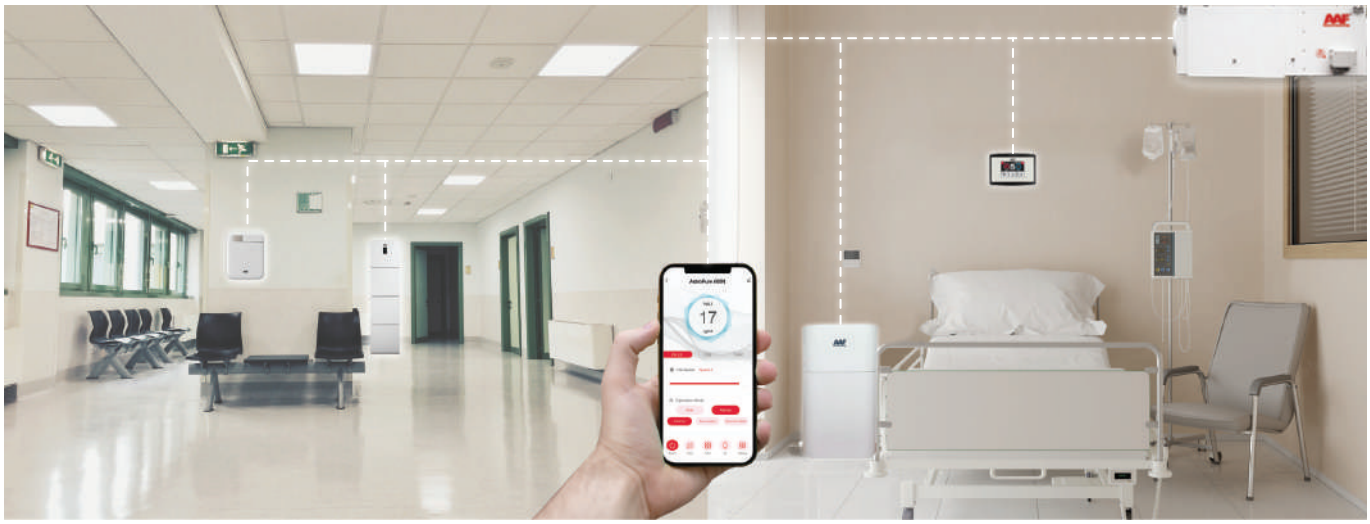
AAF Connect

The Power of Visualisation

Living in the world of IoT, we introduce the AAF Connect app, an all-new revolutionary clean air technology, enabling the visualisation of Indoor Air Quality (IAQ). With AAF Connect, users are allowed to monitor real-time indoor air quality data, further control or schedule devices at their fingertips anytime, anywhere. Better indoor air quality is now available just one tap away.

Smart Automation

Beyond controlling & monitoring, AAF Connect App features a smart automation setup function. Users are allowed to create automated product responses with given variables effortlessly. For example, you may connect AAF, thereby achieving better energy-saving. Moreover, this automation can be performed across AAF products. With AAF Connect, we provide a total smart clean air system to all users, living a smarter life with better indoor air quality.



Sensor360

Extensive Studies Show:

- Particles with an aerodynamic diameter of **2.5 micron** are small enough to reach the **human lung and deposit in the bronchia**
- Particles smaller or equal to **1 micron** in diameter are small enough to find their way through the cell membranes of the alveoli into the human blood stream, and **cause life-threatening diseases**

Making the Invisible Visible

With Sensor360 filtration monitoring technology, what was once invisible is now visible. At any given moment, the air surrounding us and filling our lungs contains billions of particles too small to be seen, but powerful enough to impact our health, the operation of equipment and instrumentation, and manufacturing processes. Sensor360 uses innovative technology to monitor air quality and provide early warning of air contamination and failure.

This app-driven HVAC sensor technology, proactively tracks and notifies facility teams of filtration system performance, including unit location, pressure drop, MERV rating, PM levels 1, 2.5, and 10, filter type, filter size, and quantity. By proactively monitoring air quality, facilities can optimize preventive maintenance scheduling, decrease deferred maintenance, save money, reduce risk, and gain time while optimizing your total cost of ownership for clean indoor air.

24/7 Monitoring and Early Warning System

Sensor360 is the first IoT (Internet of Things) patented technology platform that directly correlates filtration system performance and Indoor Air Quality (IAQ) by tracking and communicating particulate penetration levels in real-time. The Sensor360 app immediately alerts facility managers when particulate levels are at an unacceptable concentration. The 24/7 monitoring and early warning system detects IAQ threats enabling facility teams to resolve issues before a negative impact occurs. In addition, the program also analyzes trends to identify opportunities for improvement and optimize process performance.

On-Demand Air Quality Analytics

Sensor360 technology detects and monitors particles using sensors to measure particulate matter and pressure differential across air filters. Battery-powered sensors are installed to measure both particulate concentration before the air is filtered and to measure the filtered indoor air quality. The sensors are connected to a network gateway that communicates through a cloud service platform to the Sensor360 app installed on the user's phone, tablet, or computer.

Air filter performance data is sent continuously, real-time through the app, which can be customized for user-defined alerts. Rather than manually collecting and auditing filter data, facility managers can now access filter information anywhere at any time. No other building automation system or monitoring tool in the marketplace offers this combination of rich filtration data and responsiveness.

Sensor360

Sensor360 Predictive Maintenance Solutions

Sensor360 makes the invisible visible through the power of IoT – Internet of Things. Through this system, sensors installed within air filtration systems collect data on particulate removal and pressure differential. Sensor360 subscribers receive resulting alerts and recommendations for improved performance via an app for desktops, tablets, and smartphones – available anytime, anywhere.

Sensor360 provides:

- Optimized TCO Diagnostic® solution design
- Enterprise-wide system monitoring with at-a-glance information on:
  - Environmental air quality
  - Filter system performance
  - System air quality
  - Differential pressure
  - Predictive maintenance warnings and alerts
  - Energy consumption
  - Total cost of ownership
  - Optimal replacement point
- 90-day risk-free trial
- Your choice of three levels of service:
  - Basic Plan
  - Active Plan
  - Worry-Free Plan

Basic Plan	Active Plan	Worry-Free Plan
Predictive maintenance solution on-demand	Predictive maintenance solution with guaranteed performance	Predictive maintenance solution with **Clean Air as a Service**
Features: • Flexible monthly billing • Air filters purchased as needed	**Features:** • Full system refresh, including: – Replacement of all current filters – Refresh or repair of existing clip systems – Filter seal replacement or repair – Fixed budget pricing • Usable filter life tracking and maximization	**Features**: • All features of the Active Plan, plus: • Turnkey service and transparency, including: – Guaranteed PM 2.5 efficiency – Ongoing filter system service and management – Remote monitoring – Occupant dashboards that demonstrate clean air performance
Ideal for customers who: • Have dedicated maintenance staff with ample time for filter changeouts and disposal • Need financial flexibility of month-to-month billing	**Ideal for customers who:** • Need to relieve burden of reactive maintenance for staff • Need predictable preventive maintenance schedules with data to respond proactively to changing conditions	**Ideal for customers who:** • Need to focus maintenance staff on activities other than filter changeouts and disposal • Desire continually optimized HVAC system performance • Need the stability of predictable spending on filters, monitoring, and all related maintenance – no unpleasant surprises

Exclusively from AAF, you can now subscribe to **Clean Air as a Service.** We monitor and optimize your air filtration system, even changing out filters and making adjustments as needed. Sit back and breathe the clean air!

Sensor 360® Making the Invisible Visible.®

Field Services

AAF Branch Services

As AAF has grown and changed over the years, we remain focused on one basic goal – providing our customers with clean air. As maintenance budgets and staffing levels decrease, and operational complexity increases, organizations increasingly look to partners to help manage their HVAC systems.

Along with our production plants, AAF operates strategically located branch offices to better serve the needs of organizations such as facility management companies, contractors, and end users. These branch offices provide expedited availability of commonly ordered air filters, on-site production of special sizes, and additional specialized HVAC services. We are planning to open even more branch locations every year, so if there's not one in your area, look for one opening soon!

Along with providing local access to filters, our branch offices perform on-site HVAC services. Not just filter experts, our dedicated HVAC technicians also perform critical services on air handlers and everything attached to them, freeing up maintenance staff to address other critical areas on schedule. To that end, we added the expertise of such companies as Aire Filter Products in the western U.S. and Air Filter Maintenance in the east. Both outfits have decades of experience providing local service to our customers wherever they are: in grocery stores, commercial buildings, medical facilities, government buildings, and other settings. We now offer the services identified below.

On-site filter replacement programs

These programs ensure that all filters are replaced on time and as-needed. First, an AAF representative works with the building engineer or facility manager at each location to understand your unique needs and establish changeout cycles. Once we've established a changeout plan, we ensure both physical and electronic records are kept, recording the date that clean filters are installed. We also dispose of spent filters, saving additional costs and labor. Our techs can handle any type of HVAC unit, from large banks to single-filter package units, and heat pumps to rooftop air handlers. For challenging access areas, we transport filters to the roof via ropes, cranes, and lifts, and we equip our trucks with multiple ladders to ensure we can access any unit regardless of location.

Duct cleaning

Unfortunately, outstanding filter performance and maintenance matters little if your ducts downstream of the filters contain built-up dust and dirt. In this scenario, the air flowing into your facility will not be as clean as needed, and your system cannot operate efficiently. However, keeping your ducts clean and well-maintained is a frequently forgotten, yet critical, step in HVAC maintenance. Our experienced service personnel are equipped to handle this chore as well. Typically they perform this service during off hours, so that they don't disrupt day-to-day operations. Their collective experience ensures that the crew accesses the ducts at the correct location to provide the most thorough cleaning possible.

Coil cleaning

The cleaning of heating and cooling coils represents another often-overlooked but crucial HVAC service. Even very light buildup of dust on coils inhibits your HVAC system's ability to transfer heat, increasing energy usage and reducing its life. For example, studies have shown that with equipment operating with scaling of .036" of dust on coils increases related energy costs by more than 30%. Additionally, the dust clogging the coil increases pressure drop, adding to the strain on your system and energy consumption. In fact, we've found that often the resistance added by dirty coils far outweighs the resistance introduced by HEPA filters! Our service technicians restore your equipment to operate at its intended efficiency by deep cleaning both sides of each coil and fully clearing the condensate P-trap so that spent water drains properly.

Clean Air as a Service

With our unique combination of premium, long-lasting products, field service capabilities, and a portfolio of innovative technology tools, including Sensor360, AAF is uniquely positioned to be able to provide Clean Air as a Service. This program removes the burden of HVAC system management from your organization while ensuring:

- **Equipment Protection** – Sensor360 alerts us to issues in real-time, so that we can address problems before equipment and facilities are compromised.
- **Reduction in Reactive Work** – If equipment remains in good working order and filters are changed at the right time, then you spend less time dealing with issues caused by equipment damage or failures.
- **Proof of Optimized Maintenance** – Sensor360 maintains a history of the performance of air filtration systems, including energy use, filter changeout records, and seasonal changes in environmental conditions.
- **Waste Reduction** – Optimized filter changeouts help avoid unnecessary physical waste and energy use, thereby reducing the release of greenhouse gases.
- **Energy Optimization**- We will choose the filters that provide the most energy savings and lowest overall Total Cost of Ownership, based on the unique needs and conditions at your facility.

We strongly believe that this is the future of our industry – clean, comfortable air provided at the lowest overall total cost. AAF removes the headaches associated with air filtration and provides an unprecedented level of data that accumulates as long as you are a customer, improving our analytic and predictive abilities.

Our AAF is positioned to offer everything required - filters, service, technology, and expertise – to deliver Clean Air as a Service.
At AAF, we are truly *Bringing clean air to life.*

Containment Testing

Setting the Standard

For over 40 years, AAF has been the prime manufacturer of HEPA and HEGA containment systems for the most advanced military, pharmaceutical, hospital, and biotech lab facilities.

AAF sets the standard for the control of nuclear, biological, pharmaceutical, and chemical airborne hazards. Our products have established the benchmark for conscientious design in quality containment air filtration and have led to dramatic improvements in:

- Bag-in/bag-out housings
- Remote in-place filter testing capabilities
- Remotely operated hot cell housings
- Low leak and bubble-tight isolation damper systems
- Seismic qualification
- The use of gel seal and gasket seal techniques

Methods for Testing

Containment housings capture particles and/or gases that can cause great harm if not removed from an airstream. Because of the critical nature of these products, it is essential to perform periodic checks on the performance of the filter in the containment housing. There are two methods for testing the filter in the housing: **overall efficiency testing** and **scanning.**

Overall efficiency testing determines performance by measuring and comparing the concentration of a test aerosol upstream and downstream of each filter. The test measures the filter as an entire unit, as well as its seal in the housing.

Scanning represents a more stringent test that measures the entire face, looking for any evidence of pinhole leaks that can compromise the filter's performance. These pinhole leaks that can be detected with a scan test may be missed by an overall efficiency test due to dilution effects.

Upstream, Combination, Downstream Overall Efficiency

Inlet Test Housing - Used upstream of a HEPA filter to introduce challenge aerosol and measure the upstream aerosol concentration.

Combination Test Housing - Used between two HEPA filters, allows for overall efficiency to be measured on the HEPA immediately upstream of the Test housing and allows for introduction of aerosol challenge and measurement upstream of the second HEPA. Combination Test housings are only required on systems where there are two HEPAs in series, and overall efficiency measurement of each HEPA filter is required. In such an application, an Inlet Test housing should be used upstream of the first HEPA, a Combination Test housing should be used between the two HEPAs, and an Outlet Test Housing should be used downstream of the second HEPA.

Outlet Test Housing - Used downstream of a HEPA filter to measure the overall efficiency of the HEPA located immediately upstream of the Test Housing.

After filter installation, the challenge agent is injected upstream of the HEPA filter(s) or carbon adsorber(s). An upstream and downstream concentration is determined, and a system penetration value is calculated. The value is compared to acceptable performance criteria, and the system passes for operation or fails and requires corrective action.

In some cases, an additional test combination housing, as shown in Figure 1, is used for sampling upstream filter challenges and injecting an additional challenge for downstream filters. This type of system is designed for testing according to ASME N510, Testing of Nuclear Air Treatment Systems.

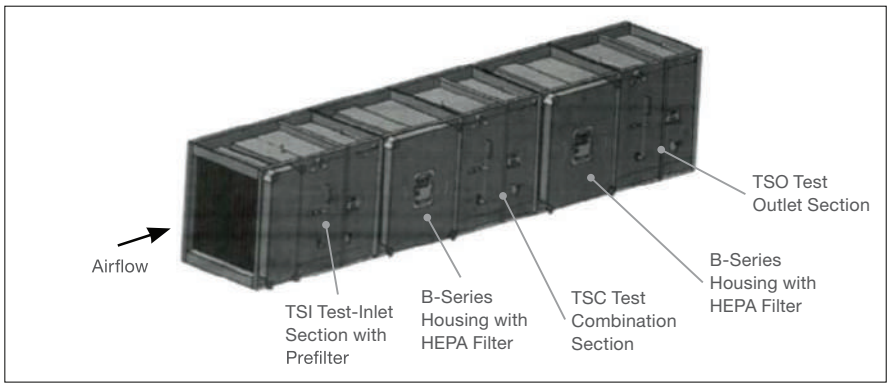


***Figure 1**: Filter Train with the ability to perform efficiency testing.*

***Note:** The system in Figure 1 shows an inlet test housing with integral prefilter track, containment components including a first stage HEPA filter housing, combination test housing, second stage HEPA housing, and a downstream test housing for efficiency testing.*

Containment Testing

Downstream PrecisionScan Test Housing

In some systems, assurance of the overall filter performance is not enough. The contaminants in some processes may be so hazardous that a pinhole leak could compromise the application's integrity.

The PrecisionScan Test Housing allows for individual scan testing of filters to ensure that the filter is leak-free. Typically, this type of system incorporates an upstream test housing (for introducing the appropriate challenge as previously described), a primary filter section, and a downstream PrecisionScan test housing with an internal filter scanning assembly.

The AAF PrecisionScan Test Housing includes an access door that is removed during the scanning process, a door flange with a bagging ring, and a clear PVC bag to allow the test personnel to operate the scan probe within one (1) inch across the entire surface of the filter per the requirements of IEST RP-CC034.3. The built-in assembly ensures that correct paths for the fixed scan probe are followed.

A PrecisionScan Test Housing is usually integrated in systems where the primary filter for testing is a HEPA filter. The scanning assembly allows correct evaluation of the filter media and any airflow paths associated with the reliability of the filter-to-housing seal.

Manually operated scan systems provide a good way for the end user to run these periodic checks on the penetration of the HEPA filter in a containment housing. These scan systems require a test technician to open a door to access the scan probe through a containment bag. Once the technician introduces the test aerosol into the containment housing, an operator then scans the filter looking for any pinhole leaks. The control of the probe speed depends entirely upon the technician, and if the scan occurs too quickly or erratically, a pinhole leak might still be missed.

AAF's AstroScan option eliminates this potential problem. With the AstroScan option, internally driven components control the probe location and speed via externally mounted motors. Additionally, this AstroScan process does not require the opening of any access doors to scan the HEPA filter. This repeatability and precision makes AstroScan the premier automatic scanning system on the market.

For more information on AstroScan and containment housings, contact your local AAF representative.

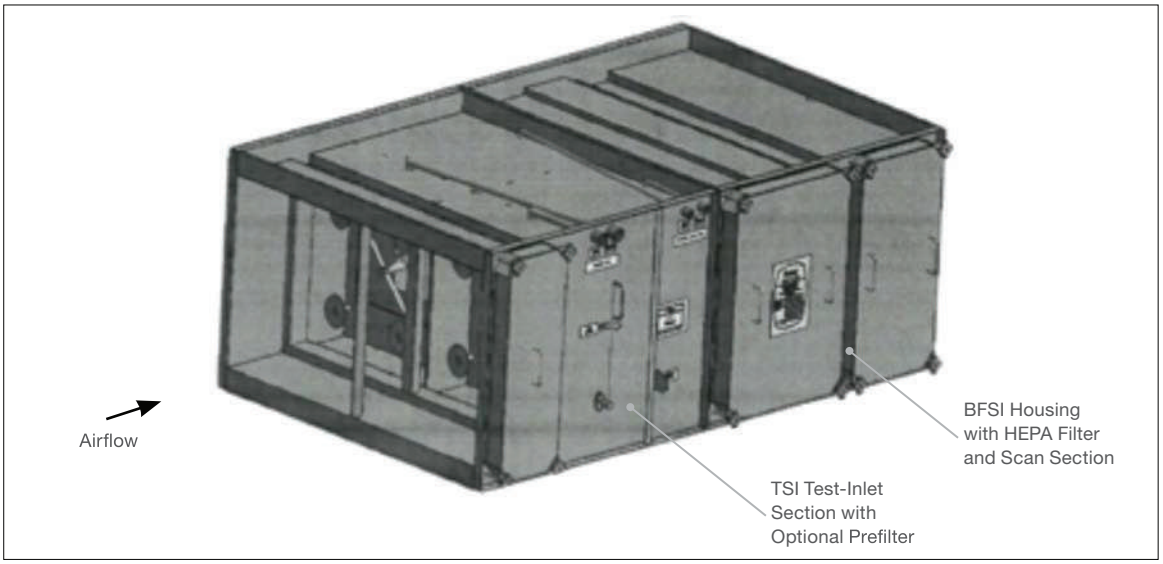
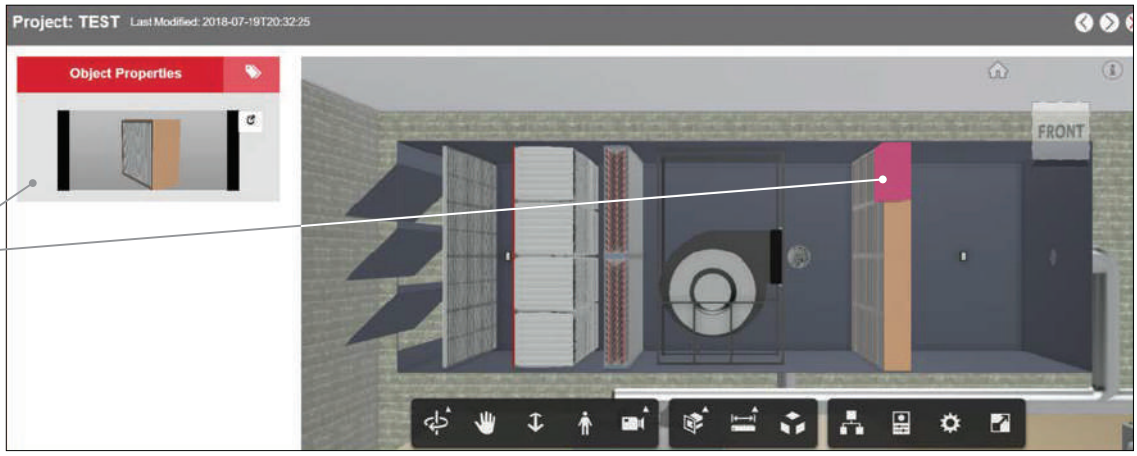


***Figure 2**: Filter Train with the ability to perform a scan test.*

***Note:** The system in Figure 2 shows inlet test housing with integral prefilter track, containment components including HEPA filter housing, and a downstream PrecisionScan Test Housing.*

VisionAir Clean with TCO Diagnostic Software

VisionAir Clean is a revolutionary new cleanroom design, configuration, and air filter selection program. Form meets function in this breakthrough new offering from AAF, designed specifically for energy optimization of air filtration systems in clean environments.



VisionAir Clean allows users to:

- Design and build multiple-room clean environments.
- View 3D renderings of your virtual designs & configurations.
- Obtain Revit files and technical drawings.
- Perform Total Cost of Ownership (TCO) calculations on the entire air filtration system.
- Generate reports on recovery time and air change rate optimization.

With VisionAir Clean, AAF puts all this power at your fingertips.

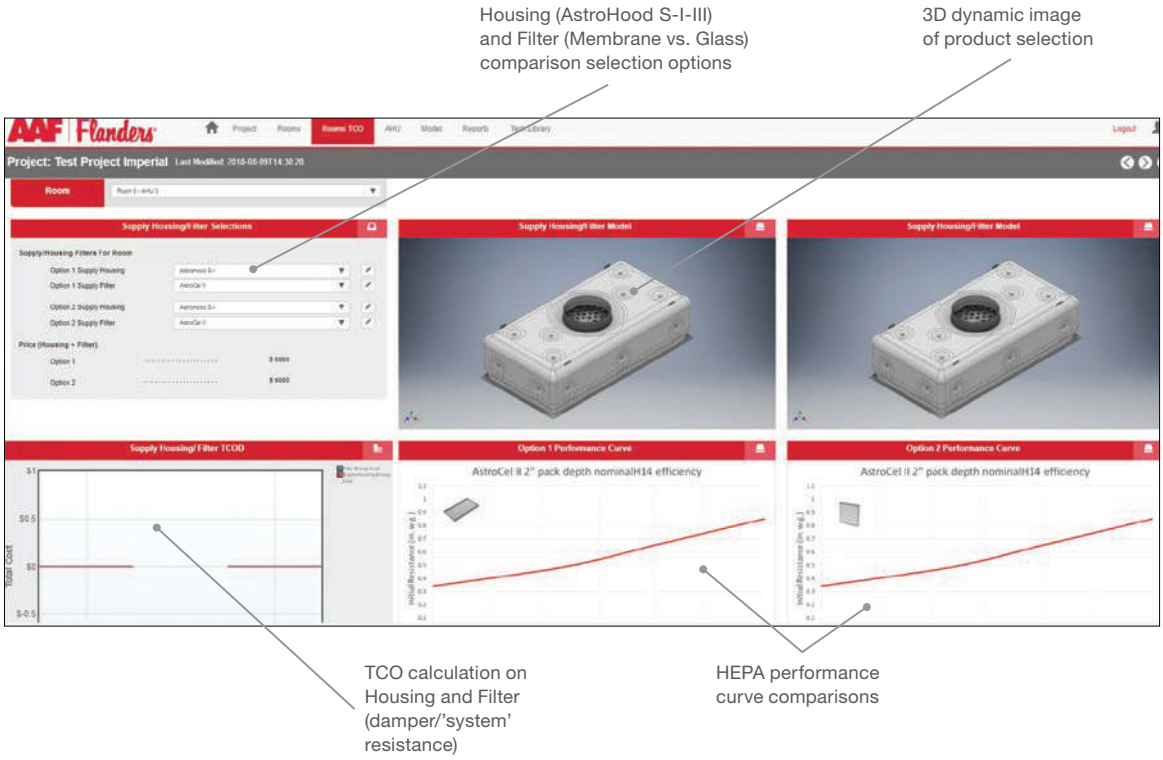
As the leading filter company worldwide, AAF has bee in pretty much every type of cleanroom there is. Through the decades, we've found that in most cases cleanrooms are, understandably, overdesigned. Typically, engineers strive to ensure compliance under even the worst conditions. However, these well-meaning engineers often do so without the information and tools required to model how their design will be affected by various circumstances and conditions. Now, with VisionAir Clean, you can model the impact of nearly every potential scenario on your proposed cleanroom, including:

- Very clean or very dirty outside air (per EPA/ISO 16890 classification)
- Street clothes or multiple levels of cleanroom garments
- Room size
- Number of air changes per hour
- Different types and number of filters and/or housings

Once you've made your selections, adjust variables to view their impact on required air change rates, standard compliance, and Total Cost of Ownership for all stages of filtration – in real time.

VisionAir Clean with TCO Diagnostic Software

Cleanrooms are far from one-size-fits-all. That's why VisionAir Clean was designed to help you model whatever your application demands. For the Life Sciences industry, for example, the program can create custom designs around 14 different cleanroom applications per ISPE and HVAC guidelines, and can even calculate multiple rooms for a cross-functional facility. There are multiple cleanroom classification options as well, for any worldwide standard that must be met, including EU GMP, ISO, FDA, or custom standards. Whether creating a cleanroom as part of new building construction or adding clean space in an existing facility, VisionAir Clean ensures that you've created the best possible design for your customer.



Once you've optimized the design of the clean space and AAF filter selections, we ensure you will have everything required to specify and demonstrate the design to the customer per their requirements. VisionAir Clean enables you to:

- Generate Revit drawings for BIM models
- Generate 2D CAD drawings
- Review detailed recovery time and air change rate optimization reports
- View 3D dynamic animations and models of selected products
- Create 3D-animated walkthroughs of the room design, from AHU to supply-exhaust devices

You'll also have access to our technical library, including product specifications and white papers, our entire high purity guide, cleanrooms calculation formulas, and all relevant standards and guidelines.

VisionAir Clean is Bringing Clean Air to Life in a whole new way. For more information on how you can gain access to this software, contact your AAF representative.

Equipment Configurator

Intelligently Built

- Allows the user to configure products to meet their specific needs
- Built on years of product and manufacturing experience
- Provides a cost for and a drawing of the configured product in less than 30 minutes
- Intelligent design at the speed of business

Equipment Configuration—Accelerated

Equipment Configurator is a design software tool for configuring products ranging from industrial HEPA filters to complex containment housings. The configuration software walks you through the entire design process using application-specific data and predefined product features, including industry-specific information and product customization options based on decades of manufacturing experience.

Equipment Configurator guides the user through various screens of input data that build on one another. To accelerate the configuration process, each screen has a number of prepopulated fields containing typical configuration parameters that can be changed as necessary. These screens contain images and/or help fields that provide design details to clarify configuration choices. The program has built-in checks and balances that automatically link or restrict certain options to prevent a design error, and to further accelerate the process.

Optimized Solution Design

While working within the tool, this program conveniently displays the name of every screen required to configure the product, with previous and upcoming options indicated at all times. Depending on the complexity of the product and design, the entire process can be completed in ~15–30 minutes. For greater ease of use, prior projects can be opened and modified to reduce the configuration process time even further.

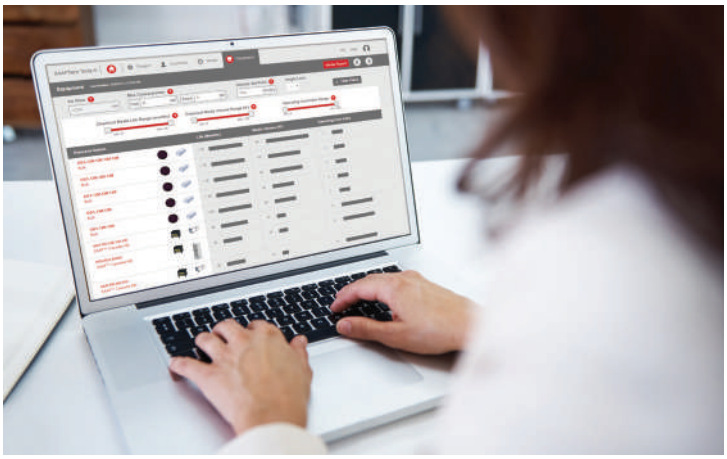
Once the configuration is complete, the user is provided several options to choose from with a scale drawing of the configured product that includes the specification, a summary of the configuration showing each input field and selected value, and the price of the configured product. The user can download the product specification directly into the project job specification, along with a DXF of the product that can be uploaded to a project drawing.

All documents within the tool can be emailed directly from the program to others working on the project. In addition, the collaboration feature allows the user to email a link to other project members to access the product configuration online and add review comments. Equipment Configurator provides you with crucial time savings while improving air quality, minimizing total cost of ownership, and optimizing solution design.

SAAF Tech Tools

The Reality of Gas-Phase Applications:

- Corrosion is non-reversible and often takes time to make its presence known…ticking time bomb effect
- Gas-phase filtration solutions are most effective when designed for a specific application



Gas-Phase Applications—Simplified

SAAF Tech Tools is a decision science solution program for configuring clean air products to remove airborne gaseous contaminants. This decision science software walks you through the entire process by using application-specific data and predefined applications, including industry-specific information. Our software works to identify optimal media solutions, the size or volume required, their projected efficiency on a given application, and the equipment needed—ultimately creating a rapidly customized submittal package.

SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem-solving experience. It starts with a built-in table of over 900 gas-phase contaminants, 10 different chemical medias designed to target and remove those contaminants, and over 30 possible equipment solutions per application. From there, the chemical media life, operating cost index, and other key variables can be set within a user-specified range to narrow down the results, based on which factor or factors are most important for the application being analyzed.

Optimize Your Application

Using chemical media utilization algorithms, SAAF Tech Tools estimates an optimized chemical media solution for you. Based on the data entered, a quick look chemical media report is generated with your initial assessment, results, and proposed solution. In addition, a full chemical media submittal may be generated that includes spec sheets, safety data sheets, and all pertinent literature for the proposed solution.

After the media selection phase, the next step is to select the proper equipment design from a comprehensive list of possible solutions that is based on your application requirements. This program gives you the ability to sort and filter equipment options to arrive at the optimum solution. A quick look equipment report showing your assessment, results, and operating cost index is generated, as well as a full equipment submittal, including all selected chemical media details, equipment drawings, equipment IOMs, and all pertinent literature.

Minimize Total Cost of Ownership

The Total Cost of Ownership (TCO) analysis is the final step in determining the solution to your gas-phase application. A financial considerations report is generated indicating the capital investment of the solution and ongoing chemical media replacement requirements, along with a TCO report outlining the total cost of the solution over a ten-year period. AAF delivers the latest advancements in gas-phase filtration system design, analysis, and optimization to help organizations save time and money while reducing risk.

Gas-Phase Environmental, Analytical, and Design Services

SAAF Chemical Media Remaining Life Analysis (RLA)

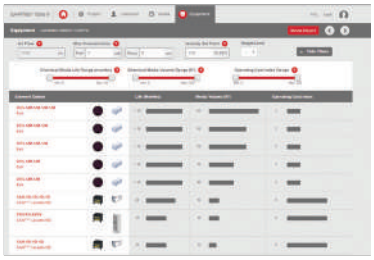
SAAF Remaining Life Analysis (RLA) measures chemical media properties to help facilities predict remaining life, replacement schedules, and inventory requirements.

Engineers and end users often ask, “How long will the media last?” or “How frequently should the media be changed?” The answer depends on the application and the gas concentrations in the environment. Various tools can help answer these questions, ranging from air measurements to occupant surveys. AAF recommends Remaining Life Analysis (RLA) for standard SAAF media. RLA assists customers in estimating remaining media life, confirming media activity, optimizing media selection, and controlling costs with timely media replacement.

Gas-phase filtration media include a wide range of materials. Virgin activated carbon, impregnated carbon, and impregnated alumina are the most common. The life of each media depends on multiple factors, such as particle size, activity level, contaminant concentrations, operating temperature, operating RH, time of operation, minimum allowable breakthrough, type of impregnant, and percent impregnation. AAF estimates the impact of these factors on media life by comparing used media properties to those of fresh media.

For each analyzed sample, AAF produces a Remaining Life Analysis Report. The report contains the installation and equipment information, an explanation of the results, recommendations, and a summary table. This data can be logged over time to analyze the RLA trend of a system.

SAAF Tech Tools



SAAF Tech Tools is a decision science solution program for configuring clean air products to remove airborne gaseous contaminants. Using SAAF Tech Tools, AAF experts can enter application specific data or select from a list of predefined applications to configure the exact clean air solution required for our customers. Detailed information on contaminants, adsorbers, oxidants, and links to industry information relevant to specific applications is also readily available.

SAAF Reactivity Monitoring Coupons (RMCs)

The SAAF Reactivity Monitoring Coupons (RMC’s) provide information on the average air reactivity over 30 days. The information they provide helps facilities evaluate area or room conditions in relation to air reactivity and take any needed action to protect their electronics, equipment, processes, artifacts, and historic assets.

RMCs determine environment reactivity through exposure in the environment and subsequent lab analysis. This technology is used to investigate the condition of control rooms or other protected environments housing electronic equipment in industrial facilities, such as pulp and paper mills, petrochemicalrefineries, and chemical plants. RMCs are also used to investigate the condition of facilities such as data centers, museums and archives, and microelectronic production or storage areas. Additionally, mechanical equipment such as compressors can be affected by reactive gases in the air and can be evaluated with RMCs. Various standards and classification schemes correlate corrosion film amounts to reactivity classifications. Therefore, AAF offers RMC reports in four different formats, each reflecting a different scale for characterizing the overall reactivity level.

Industries and Applications

Agriculture and Tobacco

Protect Your Product and Customers

The air inside one of these facilities can contain:

- Mold, spores, pollen
- Milling dust
- Bacteria and byproducts
- Volatile Organic Compounds (VOCs) used in processing agricultural raw materials
- Fumigants

Prevention of Cross-Contamination

Filtration is vital in preventing cross-contamination, ensuring consistent and superior quality products, and protecting people and process equipment. Cross-contamination can lead to production downtime and product loss, both of which impact the yield and profitability of farmers. Having a well-sealed environment is the first step to preventing cross-contamination, and having superior filtration is key to maintaining the integrity of the process.

Toxic Fumigant

A unique niche in the agricultural production arena is tobacco harvesting, storage, drying, and packaging. The types of fumigation, the storage times and limits, and the throughput are very specific for tobacco crops. Methyl bromide is commonly used to fumigate the tobacco product as it is being dried and stored. Since this is a highly toxic fumigant, gaseous contaminant remediation is necessary.

AAF's gas-phase filtration media is ideally suited for remediation of methyl bromide and the other specialized fumigants used in the tobacco industry. Additionally, high efficiency filtration, coupled with antimicrobial treatment, is needed when moving and storing tobacco products.

Optimize Your Environment

Air filtration, as it pertains to the growing and refining of grain and crops, is very important for both particulate and gaseous contaminant remediation. With regard to grains and other agricultural products, particulate filtration is of substantial importance. Air filtration systems in facilities that deal with these products must handle relatively large volumes of air with various sizes of particulates that need to be removed.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 you can improve air quality, energy savings, and operational flexibility while reducing total cost of ownership.

Source: Building air quality, a guide for building owners and facility managers, Environmental Protection Agency, 1991

Additional Solutions You May Be Interested In:

For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Biotechnology

Biological risk can be reduced and controlled by the correct application of internationally recognized procedures such as:

- Proper microbiological techniques
- Adequate facilities
- Protective barriers
- Special training
- Education of laboratory workers
- Proper containment apparatus, such as complete containment air filtration systems

Protection from Hazardous Biological Agents and Infectious Pathogens

The field of biotechnology encompasses the harnessing of cellular and biomolecular processes to develop technologies and products that improve lives through advancements in areas such as medicine, agriculture, fuel generation, and water conservation. Biotechnology research and development is performed by universities, hospitals, pharmaceutical companies, research facilities, and government and military agencies.

Stringent regulatory requirements govern the operation of biosafety labs and are based on a four-tiered risk classification system ranging from no or low individual and community risk, to high individual and community risk. Containment filtration systems are essential to ensuring the safety of biosafety lab personnel, the community, and the environment.

Addressing Risks Associated with Biotechnology Research

- Research with pathogenic agents, such as virus, parasites, bacterial microorganisms, or genetic modified organisms, has potential biological risk – not only for people, but also for the environment, due to the pathogenic agents' unpredictable behavior.
- Concern for biosafety is generated in part by the emergence of new diseases or re-emergence of diseases that were already under control.
- Biotechnology laboratories require biosafety measures designed to protect their staff, the population, and the environment.

Single Source Manufacturing and Expertise in Critical Biosafety

AAF specializes in the design, manufacturing, and testing of complete custom containment filtration systems incorporating HEPA filters with maximum filtration efficiency for a virtually particulate-free lab environment to prevent product contamination. The system also filters and contains harmful microbes, eliminating them from the exhaust air.

AAF's leading expertise in critical applications and single-source, total system approach ensure compliance with stringent regulatory requirements for biosafety labs, and provide fail-safe protection from the significant potential dangers involved in biotechnology research and development.

Source: Biological Risks and Laboratory-Acquired Infections: A Reality That Cannot be Ignored in Health Biotechnology, April, 2015

Additional Solutions You May Be Interested In:
For information on Equipment Configurator, turn to page 46.
For information on MEGAcel II, turn to page 128 & 129.

Commercial Buildings

Extensive Studies Show:

- 34% of American workers feel that **poor IAQ had caused them to miss work**
- For every 1,000 workers, **poor IAQ** results in 600 sick days per year
- 56% of commercial maintenance teams actually admit that their **IAQ maintenance is not carried out per IAQ guidelines**
- 88% of facility managers say that **deferred maintenance is an issue**

Indoor Air Quality (IAQ) is of Primary Concern

In commercial office buildings, Indoor Air Quality (IAQ) is a primary concern. IAQ refers to the indoor air breathed in by a building's occupants. The pollution levels in this indoor air can be up to five times higher than outdoor levels, and poor IAQ ranks as one of the top five environmental risks to public health.

The Air Inside These Buildings Can Contain:

- Molds, spores, pollens
- Carbon monoxide, radon, volatile organic compounds (VOCs)
- Bacteria, viruses, and byproducts
- Vehicle engine exhaust, exhaust from industrial plants
- Asbestos, clays, elemental particles, and man-made fibers

Optimize Your Environment

Air filtration systems in commercial facilities must handle relatively large volumes of air. Approximately 50% of a building's energy consumption goes to the heating, cooling, and moving of air. In considering the Total Cost of Ownership (TCO), it is important to keep in mind that in order to have a cost-effective building, planning maintenance is an important step in maintaining energy efficiency, minimizing costly repairs, and extending the lifespan of your equipment.

LEED® Accreditation

AAF can assist you in the processes required to earn Leadership in Energy and Environmental Design (LEED) credits. The LEED Green Building Rating System,™ administered by the U.S. Green Building Council, is the nationally accepted benchmark for designing and sustaining green buildings.

Proper Air Filtration Strategies Contribute to Four of the Six LEED Credit Categories:

- Energy and Atmosphere (Efficiency)
- Indoor Environmental Quality
- Materials and Resources
- Innovation in Design/Operations

Sources: The real cost of poor IAQ; The effects of indoor air quality on performance and productivity, D.P. Wyon, 2004; The causes and costs of absenteeism in the workplace, Forbes, 2013; Perceptions in the U.S. building industry of the benefits and costs of improving indoor air quality, M. Hamilton et al, 2015

Additional Solutions You May Be Interested In:

For Information on Equipment Configurator, turn to page 46.
For Information on IAQ, turn to page 3.
For Information on TCO Diagnostic, turn to page 44.

Compounding Pharmacies

Providing Contaminant-free Environments for Pharmaceutical Drug Compounding

Compounding pharmacies prepare personalized prescription medications from individual ingredients mixed together in the exact strength and dosage required. Compounded medications can include capsules or tablets, creams or gels, and injectables. Because the risk of infection is greater with injectables, they must be prepared according to strict standards established by the United States Pharmocopeia (USP) Chapter 797 regulations for compounding sterile products.

Based on these standards, the air in the compounding area must meet ISO Class 5 standards for clean air, which specify the number of particles permitted per cubic meter of air, to prevent microbial contamination that could cause infection in patients. Containment air filtration systems are essential to ensuring an environment free of dangerous microbial contaminants for compounding drugs safely.

Single Source Manufacturing and Expertise in Critical Pharmaceutical Applications

Containment filtration systems are designed, developed, and manufactured to exact standards for control of microbial contamination in compounding pharmacies. High quality, customized total containment filtration systems manufactured by a single source ensure maximum performance reliability in adherence with required ISO Class 5 standards for clean air.

AAF specializes in the design, manufacturing, and testing of complete, custom containment filtration systems incorporating HEPA filters with maximum filtration efficiency for a virtually particulate-free environment to prevent contamination of compounded drugs. The systems also contain fan filters units, terminal modules, and Model 22 hoods (PharmaGel modules) for fail-safe filtration.

AAF's leading expertise in critical applications and single-source, total system approach ensure compliance with stringent regulatory requirements for clean air and sterility, providing an environment free of microbial contamination that could lead to serious and deadly infections in patients.

Source: ASHP, Compounding Discussion Guide, November 2012

Additional Solutions You May Be Interested In:
For Information on Equipment Configurator, turn to page 46.

Data Centers

Types of Failures

Failures due to particulate and contaminant dust are generally classified as:

- Mechanical effects, including obstruction of cooling airflow, interference of moving or optical parts, and deformation of surfaces.
- Chemical effects, including corrosion of electrical components, due to dust comprised of sulfur and chlorine bearing salts.
- Electrical effects, including impedance changes and electronic circuit conductor bridging.

Critical Importance of Indoor Air Quality (IAQ)

Air quality within data centers is more important today than ever. Data centers have unique requirements and strict regulations, compared to a typical commercial site. Particulate and corrosive gaseous contaminants have become a serious problem for data centers and server rooms. In some cases, corrosion of electronic components has resulted in catastrophic failures of equipment, due to environmental conditions such as low concentrations of corrosive gases. These contaminants enter data centers in a variety of ways, including outdoor ventilation systems, adjacent interior areas, and with individuals entering and exiting the facility or critical areas.

Corrosive Contaminant Risk

Sulfur-bearing gases, such as sulfur dioxide (SO_2) and hydrogen sulfide (H_2S), are the most common gases causing corrosion of electronic equipment. Once introduced in a data center or server room environment, these gaseous contaminants lead to deterioration of copper surfaces and silver solder used on computer circuit boards, leading to intermittent and hard failures. These forms of corrosion can cause failure by either impeding the flow of electricity or forming unintended circuit paths. Elimination of corrosive contaminants is therefore essential in maintaining data center equipment reliability.

Optimize Your Environment

In data centers with air-side economizers, supplemental real-time monitoring, such as AAF's SAAFShield Technology, is recommended to enable quick reaction to outdoor events that may introduce corrosive gases into data centers. Real-time monitoring is also recommended in data centers with gas-phase filtration air cleaning systems, in order to track the efficiency of the filters.

For data centers with or without air-side economizers that do not fall within the ISA-71.04 severity level G1 for copper and silver corrosion, remediation through gas-phase filtration is recommended. Blowers at air inlets, fitted with particulate and gas-phase filters, can be used to fill the data center with clean air and pressurize it to prevent contaminated outdoor air from leaking into the data center. The air in the data center can be recirculated through gas-phase filters to remove contaminants that are generated within the data center.

Additional Solutions You May Be Interested In:
For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Deferred Maintenance

Extensive Studies Show:

Short-term solutions and price-driven shortcuts may be perceived as problem solving, but in reality they end up costing companies more.

- **$5 million** – annual facility cost of **deferred maintenance**

  – **36%** of companies say that number is even higher!

- 88% of facility managers say that **deferred maintenance is an issue**
- Each **$1** avoided by **deferred maintenance** creates **$4** in **future expense**
- **HVAC** – the system **most affected by deferred maintenance**

Sources: Department of Energy, 2006 Buildings Energy Data Book; Paying for Deferred Maintenance, Buildings.com, June 2006; Research by Rick Biedenweg, President of Pacific Partners Consulting Group and former Assistant Vice President of information resources of Stanford University, as reported by schooldude.com.

The High Cost of Deferred Maintenance

By definition, deferring maintenance is the practice of postponing system checks, repairs, and upgrades to a later budget cycle due to a lack of time, money, or both. The idea is to minimize the investment in existing systems and personnel to improve cash flow and reduce expenses. In other words, spend less, get more. Instead, deferred maintenance can lead to:

- Unplanned expenses
- Safety risks
- System downtime
- Production downtime
- Missed profit opportunities

The cost of waiting to maintain equipment could potentially be **30 times higher** than the early intervention cost.

Ongoing Maintenance of HVAC Systems Is Critical

Half of a facility's energy costs are attributed to heating, cooling, and moving air. When HVAC systems are not maintained on time or as planned, they do not perform as they should. Air handler blower fans and other components may begin to short cycle and wear themselves out. The more that components turn on and off and on again, the more energy you waste, and the more likely it is that you'll be dealing with spikes in energy costs.

> *Energy costs are up to 81% higher in facilities with deferred maintenance issues—71% of this increase is HVAC related*

Filters are essential to your HVAC system's performance and can extend the life of the system components, decrease your energy spend, and when properly selected, reduce the labor burden of your team, saving you time and money.

Optimize Your Environment

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 systems can perform even better. TCO Diagnostic helps reduce deferred maintenance backlogs and decrease reactive time by analyzing system data, optimizing preventative maintenance schedules, and extending changeout cycles. This tool provides complete optimization of your filtration system, improving air quality, energy savings, and operational flexibility, while reducing total cost of ownership.

Additional Solutions You May Be Interested In:

For Information on Air Filtration Audit, turn to page 34.
For Information on TCO Diagnostic, turn to page 44.

Environmental Solutions

Product Portfolio

With more than 100 years experience, AAF understands that it is critical to ensure that any filtration product is suitable for the application. Consequently AAF maintains an exstensive product portfolio to ensure only the correct product is selected depending upon the specific application requirements.

- Dry Dust Collector (Fabric and Cartridge)
- Wet Dust Collector
- Specialist Filters
- Genuine and Replacement Parts

Introduction

AAF is a global leader in environmental solutions. The business has dedicated environmental systems and products divisions to provide the optimum support and service levels. Being in a key position within the marketplace allows AAF to offer solutions to resolve all types of dust control problems. Regardless of a customers' application or industry, AAF has the knowledge, experience, and resources to get the job done confidently and guaranteeing the environmental solution to eliminate any dust control issue.

Better by Design

With an extensive list references, and a history spanning more than 100 years AAF has tackled some of the most difficult applications in almost every industrial sector. From wet, sticky, oil laden air to hydroscopic and explosive dusts; AAF has a solution to complement your operation.

Manufacturing

AAF customers demand quality and reliability. Our global manufacturing capability ensures consistent product quality, on time delivery within your budget.

Total Plant Performance

Improving health, energy and efficiency by reducing the total cost of plant ownership AAF understands that a fully intergrated solution developed in partnership with our customers can significantly reduce operational cost, whilst improving plant hygiene, workforce efficiency and ensuring an environmentally compliant work place.

The Evolution of Target Zero

By adopting a focused approach to develop intergrated solutions AAF consider the areas which matter most to our customers. Our objective being to deliver TARGET ZERO solutions

- **Target Reducing Cost -** solutions focused on a return of investment and total plant ownership.
- **Target Reducing Emission -** legislative comliance linked to product longevity.
- **Target Reducing Maintenance -** pro-active maintenance programmes and down time reduction.
- **Target Reducing Workplace Exposure -** improved hygiene for reduced cleaning, workplace comfort and legislative compliance.

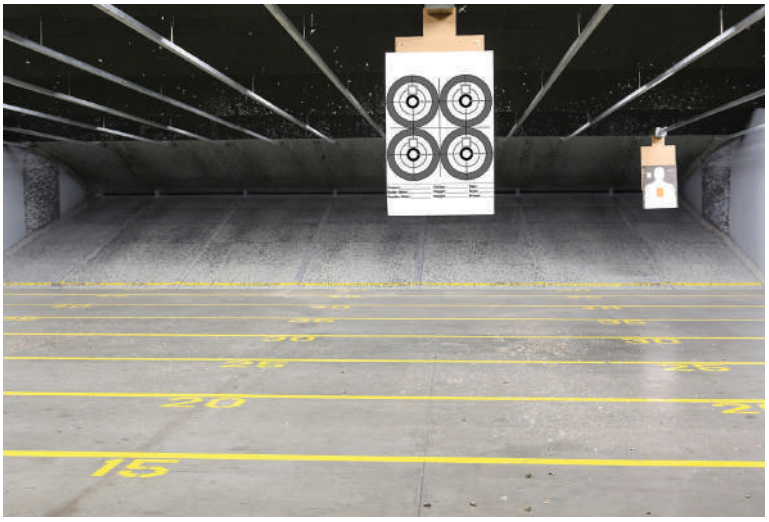
Firing Range

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(3) 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.

Source: OSHA Regulations (Standards-29 CFR) Part 1910 Occupational Safety & Health Standards



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.

Optimize Your Environment

The primary purpose of an air filtration system in these facilities is to prevent the build-up of toxic gases (CO_2, CO, NO) and particulates, including lead and other discharge products. The benefits of proper air filtration include:

- Elimination of dangerous air contaminants, resulting in improved quality of life for employees and users alike
- Compliance with EPA and OSHA regulations
- Reduced liability from lawsuits resulting from employee health problems
- Reduced employee absenteeism and disability
- Improved fire range capability

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 you can improve air quality, energy savings, and operational flexibility while reducing total cost of ownership.

Additional Solutions You May Be Interested In:
For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Food & Beverage

Extensive Studies Show:

- **Government regulation** continues to rapidly **change and increase**
- There are **175,268 pages on IAQ** in the U.S. Code of Federal Regulations
- **56%** of commercial maintenance teams actually admit that **their IAQ maintenance is not carried out per IAQ guidelines**
- Indoor pollution levels can be **up to 5 times higher** than outdoor levels (in many cases up to 100 times higher)
- Lack of proper air filtration is the **#1 cause of poor IAQ**

Sources: State of the Air 2015, American Lung Association, 2015; Database of state indoor air quality laws, Environmental Law Institute, 2015; The impact of air pollution on cognitive performance and human capital formation, Victor Levy et al, 2012

Prevention of Cross-Contamination

Within the Food and Beverage manufacturing facility, filtration is vital in preventing cross-contamination, ensuring consistent and superior quality products, and protecting people and process equipment.

Cross-contamination can lead to production down time and product loss, both of which impact the yield and profitability of the food and beverage producer. Having a well-sealed environment is the first step to preventing cross-contamination, and having superior filtration is key to maintaining the integrity of the process.

Protect Your Product, Customers, and Reputation

When any food or beverage producer wants to make a consistent and high quality product, filtration is the line of defense that prevents mold, spores, bacteria, viruses, and other byproducts from entering the manufacturing space. Environmental, health, and safety concerns factor into the equation both inside and outside of a manufacturing space. Both production workers and the outside environment need protection from the types of contamination that could be released into the air.

The Air Inside These Facilities Can Contain:

- Molds, spores, bacteria, or viruses
- Volatile organic compounds (VOCs)
- Malodorous compounds (e.g., vinegar)
- Fine dusts from sugar, flour, and/or other dry ingredients

Optimize Your Environment

AAF is ideally positioned to assess a food and beverage facility for room sealing, filtration efficiency and effectiveness, and for continuous improvement opportunities. Using a collaborative and consultative approach, AAF strives to understand your complete filtration needs and applications, as well as advising you on regulatory requirements for total air quality.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 you can improve air quality, energy savings, and operational flexibility while reducing total cost of ownership.

Additional Solutions You May Be Interested In:

For Information on TCO Diagnostic, turn to page 44.

Government Infrastructure & Homeland Security

Government/Homeland Security Critical Infrastructure Protection:

- Government facilities
- Energy
- Information technology
- Transportation
- Postal and shipping
- Communications
- National monuments and icons

Protection of Critical Government Infrastructure

The public relies on the government to perform functions critical to homeland security, commerce, and the American way of life. Air filtration systems that capture and contain toxic, hazardous, and noxious contaminants are essential to protecting the wide spectrum of national infrastructure required to perform these functions, including transportation systems, information technology, communication networks, public utilities, facilities, and postal operations.

Airborne contaminants pose a risk to critical government infrastructure and public safety. Threats include naturally occurring contaminants, by-products of operations, and chemical and biological weapons of terrorism. Due to the potential for disruption of essential services, loss of life, and degradation of historic treasures, effective air filtration solutions incorporating contaminant systems are imperative to government operations.

Contamination Threats to Government Operations and Homeland Security

- Naturally occurring airborne contaminants can degrade critical infrastructure, corrode electronic components, information technology, and communication networks, and impact the health of personnel with long-term exposure.
- Hazardous by-products of operations can have serious detrimental impacts on the health of personnel, the public, and the environment.
- Chemical and biological weapons of terrorism can target government operations and national monuments with the potential for significant loss of life.

Single Source Expertise and Customization for Critical Government Applications

Containment filtration systems are designed, developed, and manufactured to exact standards for control of dangerous, toxic, or noxious contaminants. High quality, customized total containment filtration systems manufactured by a single source ensure application compatibility and maximum performance reliability for unique, multiple-risk environments that need protection from potentially devastating contaminants.

AAF specializes in the design, manufacturing, and testing of complete custom containment filtration systems. Our leading expertise in critical applications and single-source, total system approach provide the reliability and efficiency required for government operations.

Additional Solutions You May Be Interested In:
For Information on Equipment Configurator, turn to page 46.

Gas Turbines Solutions

Increase Turbine Reliability

- Increase machine availability
- Recover lost power
- Enhance fuel efficiency
- Extend engine life

Gas Turbine Solutions

At AAF, our years of experience underpin our expertise, our mission is to provide best in class service and support throughout the lifecycle of your plant. We strive to ensure your assets utilise the best available technology providing highest availability, superior efficiency, higher power output, greater reliability and easier maintenance.

Inlet and Filtration Solutions

With an extensive range of solutions to protect critical components, AAF is recognised globally for its quality, expertise and innovation in air inlet treatment and filtration. For over 50 years, AAF has been a leader in the design and application of gas turbine air filtration, developing a range of static and pulse filter solutions for all operating environments.

Designed for your Operational Requirements

AAF's entire product range meets all industryand original equipment manufacturers' (OEM) standards, ensuring superior protection and total peace of mind. With a product portfolio that utilises the latest innovations in technology to enhance gas turbine performance. This results in greater gas turbine availability, a higher constant power output, an increase in engine component life, lower operating costs, reduced heat rate and an increase in fuel efficiency.

Applications

- Power generation plant
- Mobile generation unit
- Oil & gas platform
- FPSO vessel

Filtration

- Prefilters
- Static filters
- Pulse filters
- (H)EPA upgrades

Environments

- Desert
- Rural
- Coastal
- Marine
- Arctic
- Tropical
- Industrial
- Urban

Inlet solutions

- Evaporative cooling
- InstaKool
- Mechanical chillers
- Anti ice protection
- Heating & cooling coils

Source: Global Products & Services (Performance enhancement for gas turbines), © 2020 American Air Filter Company | GT.GTS.BR.EN.0720.3

Healthcare

Extensive Studies Show:

- Three to four million hospital-acquired infections (HAI) occur annually, with **up to 80,000 fatalities**
- Up to one-third of hospital-acquired infections involve **airborne transmission**
- There are **175,268 pages on IAQ** in the U.S. Code of Federal Regulations
- 56% of commercial maintenance teams actually admit that their **IAQ maintenance is not carried out per IAQ guidelines**
- Lack of proper air filtration is the **#1 cause of poor IAQ**

Sources: Air-treatment systems for controlling hospital-acquired infections, HPAC Engineering, April 2, 2008; Database of state indoor air quality laws, Environmental Law Institute, 2015; Perceptions in the U.S. building industry of the benefits and costs of improving indoor air quality, M. Hamilton et al, 2015; State of the Air 2015, American Lung Association, 2015

Indoor Air Quality (IAQ) is Critical to Patient and Worker Safety

Clean air is vital in hospital and healthcare facility operations to protect patients, staff, and visitors from airborne diseases and infections, as well as to provide a comfortable, healthy, and odor-free environment. The Indoor Air Quality (IAQ) in the facility, referring to the air breathed by the building's occupants, is of primary importance because of patients' suppressed immune systems, making them more susceptible to adverse health effects. Poor IAQ ranks as one of the top five environmental risks to public health.

The Air Inside These Facilities Can Contain:

- Molds, spores, pollens
- Carbon monoxide, radon, volatile organic compounds (VOCs)
- Bacteria, viruses, and byproducts
- Vehicle engine exhaust, exhaust from industrial plants
- Asbestos, clays, elemental particles, and man-made fibers

Optimize Your Environment

Faced with an influx of potentially contagious patients and their families, it is clearly imperative to reduce risk by removing airborne contaminants generated inside and outside the doors of the facility. In addition to the effects of contaminants on patients and hospital workers, corrosive gases can damage HVAC units, control rooms and electronic instrumentation, diagnostic equipment, X-ray machines, and office equipment.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 you can improve air quality, energy savings, and operational flexibility while reducing total cost of ownership.

Additional Solutions You May Be Interested In:

For information on Air Filtration Audit, turn to page 34.
For Information on IAQ, turn to page 3.
For Information on TCO Diagnostic, turn to page 44.

HEPA Filter Leak Testing

Extensive Studies Show:

- **77%** of production downtime can be attributed to **failures of equipment** and **environmental problems**
- Loss from a single microglass filter leak:
  - **$250,000+/hr** (two hours of unplanned downtime)
  - **$20,000** (documentation and meetings)

  Total Cost: $520,000+

Source: Pharmaceutical Manufacturing Magazine (2004)

Hidden Dangers of HEPA Filter Leak Testing

Cleanrooms are used in practically every industry where small particles can adversely affect the manufacturing process. Cleanrooms vary in size and complexity, and are used extensively in industries such as semiconductor manufacturing, pharmaceuticals, biotech, medical device, and life sciences, as well as critical process manufacturing common in aerospace, optics, military, and the Department of Energy. Maintaining filter integrity is a challenge for every cleanroom operation. HEPA leaks affect each step in the manufacturing process, from construction and production to federal compliance, unplanned downtime, and equipment failure. It's a major part of any company's reputation and financial bottom line.

FDA regulations require regular testing, but how often testing procedures are utilized beyond those requirements depend on the quality of the filters and how they are used. HEPA filter integrity has to be maintained to ensure the rated ISO Cleanroom Classification requirements. Overcertification in non-critical environments can cause significant problems, such as additional costs for certification services, longer shutdown time, and greater exposure to damage and leakage.

Reducing Your Risk

Effectively managing the risks and costs associated with successful operation requires utilizing HEPA filters with dramatically higher tensile strength that are highly resistant to chemical degradation, thereby eliminating premature leaking and failure. The only HEPA filter media with these properties is polytetrafluoroethylene (ePTFE). It is the industry's first and only ePTFE media to be Polyalphaolefin (PAO) compatible, with a higher PAO holding capacity compared to microglass media. ePTFE filtration technology does not fail under standard operating procedures, cleaning, installing, or testing, and provides a durability to mitigate almost all risks of contamination from airflow.

With the extremely high tensile strength and durability of the ePTFE pleated filter media, 84 times stronger than microglass, ISO 7 and 8 areas can be tested annually. Increasing time between certifications results in less PAO exposure to the gel seal (gel degradation), lower labor costs, and increased production time.

Proven Reliability with Exceptional Performance

AAF ePTFE Filtration Technology is designed specifically for the unique requirements and challenges of critical cleanroom applications. The MEGAcel II mini-pleat HEPA filter has the proven durability, polyalphaolefin (PAO) compatibility, high particulate filtration efficiency, and lowest pressure drop to meet the demands of critical process manufacturing.

Additional Solutions You May Be Interested In:
For Information on MEGAcel II, turn to page 128 & 129.

Hospitality

Extensive Studies Show:

- In the United States alone, hotels represent more than 5 billion square feet of space, nearly 5 million guest rooms, and close to **$4 billion in annual energy use**
- 56% of commercial maintenance teams actually admit that their **IAQ maintenance is not carried out per IAQ guidelines**
- Lack of proper air filtration is the **#1 cause of poor IAQ**
- 88% of facility managers say that **deferred maintenance is an issue**

Sources: LEED & the Hospitality Industry FAQ, www.usgbc.org/hospitality; Perceptions in the U.S. building industry of the benefits and costs of improving indoor air quality, M. Hamilton et al, 2015; State of the Air 2015, American Lung Association, 2015; CHP in the Hotel & Casino Market Sectors, U.S. Environmental Protection Agency CHP Partnership, December 2005; Assessing Green Building Performance, GSA Public Buildings Service

Critical Importance of Indoor Air Quality (IAQ)

The hotel guest experience is critical to the highly competitive and ever-changing hospitality industry. Excellent IAQ is a key component of that experience. In a hotel, convention, or casino environment, people spend 80% of their time inside the buildings. The indoor environment is therefore the most fundamental element of service quality. Guests want a healthy and comfortable environment in order to be productive at meetings and enjoy their leisure time, be it in their rooms, in restaurants, or around establishment premises. At the same time, employees need to be able to concentrate to work efficiently. To meet these expectations, good indoor air quality is essential.

The Air Inside These Facilities Can Contain:

- Molds, spores, pollens
- Carbon monoxide, radon, volatile organic compounds (VOCs)
- Bacteria, viruses, and byproducts
- Vehicle engine exhaust, exhaust from industrial plants
- Asbestos, clays, elemental particles, and man-made fibers

Optimize Your Environment

Air filtration systems in hotels must handle relatively large volumes of air. Approximately 50% of a building's energy consumption goes to the heating, cooling, and moving of air. In considering the Total Cost of Ownership (TCO), it is important to keep in mind that in order to have a cost-effective building, planning maintenance is an important step in maintaining energy efficiency, minimizing costly repairs, and extending the lifespan of your equipment.

Cost-Efficient Green Building Design

The U.S. Green Building Council (USGBC) works to promote cost-efficient and resource-saving green building design, construction, and operations, with the goal of protecting the global environment and human health. Green buildings use on average 26% less energy, emit 33% less carbon dioxide, use 30% less indoor water, and send 50%-75% less solid waste to landfills and incinerators. The opportunities for hospitality venues to integrate green building strategies into their design, construction, and daily operations makes good business sense and can be an important part of a company's commitment to sustainability.

AAF can assist you in the processes required to earn Leadership in Energy and Environmental Design (LEED) credits. The LEED Green Building Rating System,™ administered by USGBC, is the nationally accepted benchmark for designing and sustaining green buildings.

Additional Solutions You May Be Interested In:

For Information on IAQ, turn to page 3.
For Information on TCO Diagnostic, turn to page 44.

Livestock Environments

Extensive Studies Show:

- The **annual cost of productivity losses** due to Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) in the U.S. national breeding and growing pig herds is **$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
- 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
- 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
- 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

Source: Journal of Swine Health and Production (2013); Hoefling DC. Overview and history of SIRS. Proc Ann Meet Livest Conserv Inst. 1992;239-242; 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; Kerkaert BR, Pijoan C, Dial G. Financial impact of chronic PRRS. Proc Allen D. Leman Swine Conf. 1994;217-218.

Preventing Costly PRRS Outbreaks

The pandemic 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.

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. 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.

Air Filtration Is Your Front Line Defense Against PRRSV

Trials conducted by the University of Minnesota Swine Disease Eradication Center found that the risk of the indirect spread of PRRSV can be reduced with a comprehensive biosecurity program that includes air filtration. Unfortunately, most ventilation systems in swine facilities are typically designed to supply fresh air and control the inside temperature, not to provide air filtration. However, an effective air filtration system traps the airborne virus and its contaminants, preventing them from entering a facility and spreading throughout.

PRRS is a major concern not only for sow farms, but for cattle, dairy, and poultry farms as well. 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 both animal health and production, and operating costs.

At AAF, we understand the threat that sow and other animal farming 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, and filtration investment strategies to reduce your risk and the projected return on your investment. AAF offers air filtration solutions and climate control options to meet the unique needs of your farming operation, protecting animal health, and profitability.

Additional Solutions You May Be Interested In:
For Information on TCO Diagnostic, turn to page 44.

Microelectronics

Types of Failures

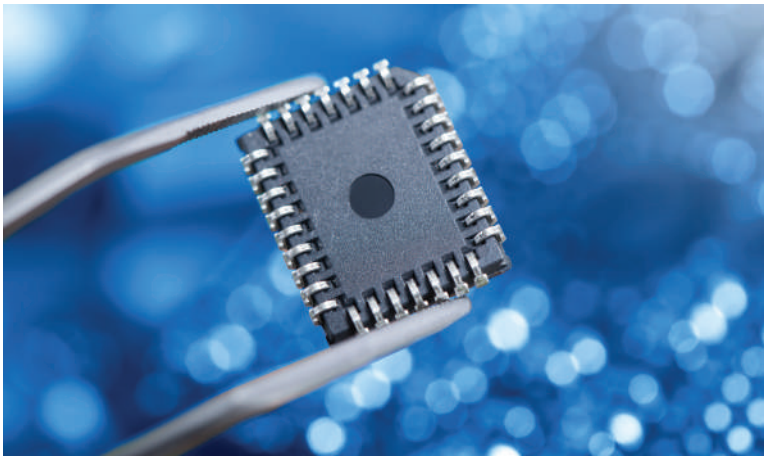
Fine particulate and Airborne Molecular Contamination (AMC) need to be carefully controlled for high-yield, low-reject semiconductor manufacturing.

Sources of AMC include:

- Chemical offgassing
- Exhaust fumes from other industries and processes
- Vehicle exhaust fumes
- Seasonal factors

Failures due to AMCs are classified as:

- Mechanical effects, including obstruction of cooling airflow, interference of moving or optical parts, and deformation of surfaces
- Chemical effects, including corrosion of electrical components, due to dust comprised of sulfur and chlorine bearing salts
- Electrical effects, including impedance changes and electronic circuit conductor bridging



Improve Yield and Reduce Risk

Air quality within high-yield, low-reject semiconductor manufacturing facilities is more important than ever. Particulate and corrosive gaseous contaminants have become a serious problem in these facilities. Contaminants enter the facilities in a variety of ways, including outdoor ventilation systems, adjacent interior areas, and with individuals entering and exiting.

Corrosive Contaminant Risk

Sulfur-bearing gases, such as sulfur dioxide (SO_2) and hydrogen sulfide (H2S) are the most common gases causing corrosion of electronic equipment. Once introduced in a data center or server room environment, these gaseous contaminants lead to deterioration of copper surfaces and silver solder used on computer circuit boards. This leads to intermittent and hard failures. These forms of corrosion can cause failure by either impeding the flow of electricity or forming unintended circuit paths. Elimination of corrosive contaminants is therefore essential in maintaining data center equipment reliability.

Optimize Your Environment

Gas-phase filtration is recommended for these facilities. Blowers at air inlets, fitted with particulate and gas-phase filters, can be used to fill the facility with clean air and pressurize it to prevent contaminated outdoor air from leaking inside. The air in the facility can be recirculated through gas-phase filters to remove contaminants that are generated within.

Using SAAF Tech Tools, a decision science solution program for configuring gas-phase applications, AAF experts can identify optimal media and equipment solutions. SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem solving experience.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 SAAF Tech Tools and TCO Diagnostic, advanced analytical software tools, to identify how you can improve air quality, energy savings, and operational flexibility while reducing failures and total cost of ownership.

Additional Solutions You May Be Interested In:
For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Museums and Historic Storage

Damage to Artifacts and Artwork Can Be Caused by:

- Uncontrolled temperature
- Relative humidity
- Dust and dirt
- Gaseous pollutants, such as ozone and sulfur dioxide

Protecting Precious and Priceless Objects

In preservation environments, Indoor Air Quality (IAQ) is a primary concern. The pollution levels in this indoor air can be up to five times higher than outdoor levels, and in some cases 100 times higher. Controlling airborne pollutants and gaseous contaminants is fundamental to protecting priceless collections of artifacts, national historical assets and documents, artwork, and literature.

Temperature and humidity, if not controlled properly, speed up the rate of chemical reactions that cause deterioration of sensitive objects. Dust and dirt contamination cause artifacts to discolor. Gaseous pollutants may cause significant and irreversible deterioration of artifacts, metals, historic records, photographs, and marble, through chemical reactions. Poor Indoor Air Quality (IAQ) can also have adverse health effects on employees and visitors.

Optimize Your Environment

Using SAAF Tech Tools, a decision science solution program for configuring gas-phase applications, AAF experts can identify optimal media and equipment solutions. SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem solving experience.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 SAAF Tech Tools and TCO Diagnostic, advanced analytical software tools, to identify how you can improve air quality, energy savings, and operational flexibility while reducing risk and total cost of ownership.

Source: The impact of air pollution on cognitive performance and human capital formation, Victor Levy et al, 2012

Additional Solutions You May Be Interested In:

For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Nuclear Applications

There are four methods of protection from identified radiation sources:

- Limiting exposure time
- Maintaining distance from the source, which decreases the intensity of radiation
- Shielding with barriers of lead, concrete, or water
- Containing dangerous particulate radioactive materials in a closed system with multiple barriers, such as complete containment air filtration systems

Protection from Nuclear Radiation

Nuclear technology has a wide range of applications in energy generation, agriculture, food preservation, water sustainability, medicine, research, industry, aeronautics, and military weapons. The inherent risk in the application of this versatile technology is human exposure to ionizing radiation. Low-level exposure has been shown to cause cancer, while high-level exposure has immediate and serious health risks and can be fatal.

In any application of nuclear technology, the removal of radioactive particulate material from exhaust air or gases is essential in preventing dangerous exposure by facility personnel and surrounding communities. Nuclear power plants also require air cooling systems to maintain atmospheric temperatures for safe operations and in response to emergency shutdowns.

Radiation Protection Standards

- Though natural sources account for up to 85% of a person's annual radiation exposure, radiation protection standards assume that any dose, regardless of size, involves a possible risk to human health.
- About 23 million workers worldwide are monitored for radiation exposure, about 10 million of whom are exposed to artificial sources, mostly in the medical sector.

Single Source Expertise and Customization for Critical Nuclear Applications

Containment filtration systems are designed, developed, and manufactured to exact standards for control of dangerous particulate radioactive material generated by applications of nuclear technology. High quality, customized total containment filtration systems manufactured by a single source ensure application compatibility and maximum performance reliability to mitigate the risk of exposure to dangerous radioactive contaminants.

AAF specializes in the design, manufacturing, and testing of complete custom containment filtration systems incorporating high efficiency particulate and gas-phase filters providing ventilation, air treatment, and contaminant containment for facilities employing nuclear technology. We also custom design and manufacture nuclear cooling coils that are tested to ASME's nuclear component certification standards; containment and safety coolers; and air handling units for maintaining required atmospheric temperatures within a nuclear facility.

Source: World Nuclear Association, Nuclear Radiation and Health Effects, July 2016

Additional Solutions You May Be Interested In:
For Information on Equipment Configurator, turn to page 46.

Pharmaceutical

Extensive Studies Show:

- Up to **65% of energy spending** at a pharma facility is related to moving air
- **77% of production downtime** can be attributed to **failures of equipment** and **environmental problems**
- **The time it takes to address a filter leak:**
  - **Five to ten minutes** planned time for an experienced team to scan a filter
  - At least **two labor hours** unplanned downtime to remove, replace, and retest a leaking filter
- Loss from a single microglass filter leak:
  - **$250,000+/hr** (two hours of unplanned downtime)
  - **$20,000** (documentation and meetings)

  Total Cost: $520,000+
- **$3,000 to $20,000 documentation costs** associated with a **single** filter **leak**

Sources: State of the Air 2015, American Lung Association, 2015; Database of state indoor air quality laws, Environmental Law Institute, 2015

Strict Standards Require the Highest Levels of Protection

Within the pharmaceutical industry, strict requirements on air purity levels are necessary because of the direct effect that airborne contamination has on the quality of the pharmaceutical products. Anything that could come into direct contact with a pharmaceutical product is a potential risk toward contamination. Especially for aseptically prepared parenteral medicine (such as injectables and infusions), no contamination can be allowed, otherwise severe harm or life-threatening health risks to the patient can result.

The Air Inside These Facilities Can Contain:

- Molds, spores, pollens
- Carbon monoxide, radon, volatile organic compounds (VOCs)
- Bacteria, viruses, and byproducts
- Vehicle engine exhaust, exhaust from industrial plants
- Asbestos, clays, elemental particles, and man-made fibers

Balancing High Level Protection with Total Cost of Ownership

Clean air is not possible without a carefully selected and reliably functioning air filtration system. The performance of installed air filters, whether terminal filters or prefilters, directly determines how effectively harmful contaminants are prevented from entering the airstream in process environments. However, if the air filter selection process does not also consider the lifetime operating costs of a given product, facilities could be exposed to unnecessary risks and expenses.

Air in critical areas should always be supplied at the terminal stage by HEPA filtered unidirectional airflow, preceded by sequential prefiltration steps. Leak-free and high filtration efficiency performance of the HEPA filter is vital for ensuring that air purity is optimized, the pressure differentials between rooms are met, and healthy working conditions are achieved.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 you can improve air quality, energy savings, and operational flexibility while reducing risk and total cost of ownership.

Additional Solutions You May Be Interested In:
For information on MEGAcel II, turn to page 128 & 129.
For Information on TCO Diagnostic, turn to page 44.

Pulp & Paper

There Are Several Ways a Plant Can Produce Pulp:

The four primary processes employed in the U.S. and Canada are:

1. Kraft (a chemical process)
2. Sulfite (a chemical process)
3. Mechanical
4. Thermomechanical

Contaminant Risk

The primary source for gaseous contamination in pulp and paper mills is the pulping process. In the Kraft pulping process, highly malodorous emissions of reduced sulfur compounds are produced. These compounds are measured as total reduced sulfur (TRS) and include hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. These sulfur compounds are often described as smelling like rotten cabbage. In the sulfite pulping process, sulfur oxides are also emitted in fairly significant concentrations. Other pulping processes, such as the mechanical and thermomechanical methods, generate significantly lower quantities of air emissions.

In addition, steam and electricity-generating units using coal or fuel oil emit fly ash, sulfur oxides, and nitrogen oxides. A secondary source of corrosive gases in the pulping process is during the bleaching step. These bleaching chemicals, which often include lime, are caustic and cause corrosion to occur.

Optimize Your Environment

For particulate filtration, dust collectors (wet and dry), bag houses, and several stages of HVAC-type air filtration products are employed to help keep the wood fiber and associated dust to a minimum. Ensuring that this dust is removed is extremely important to both the paper quality and the maintenance of the pulping equipment and paper production machines.

At a minimum, protection of the control room includes pressurization with purified air. This prevents corrosive gases from infiltrating the control room and causing corrosion problems. Additionally, recirculation air may require cleaning, if the room is a high traffic area or there are other internal sources of contaminants.

Using SAAF Tech Tools, a decision science solution program for configuring gas- phase applications, AAF experts can identify optimal media and equipment solutions. SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem solving experience.

A thorough air filter audit of your HVAC Systems is the first step that AAF 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 SAAF Tech Tools and TCO Diagnostic, advanced analytical software tools, to identify how you can improve air quality, energy savings, and operational flexibility while reducing risk and total cost of ownership.

Additional Solutions You May Be Interested In:

For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Refineries

Types of Failures

Failures due to particulate and contaminant dust are generally classified as:

- Mechanical effects, including obstruction of cooling airflow, interference of moving or optical parts, and deformation of surfaces
- Chemical effects, including corrosion of electrical components, due to dust comprised of sulfur and chlorine bearing salts
- Electrical effects, including impedance changes and electronic circuit conductor bridging

Critical Importance of Air Quality

Control rooms are utilized by large-scale refineries to monitor and control plant operations. The control room and network of control equipment are essential to plant operation and enable these facilities to maintain the highest efficiency possible. If the control room malfunctions, it can cost a plant tens of thousands of dollars per hour.

Particulate and corrosive gaseous contaminants have become a serious problem for these control rooms, sometimes resulting in catastrophic failures of equipment. These contaminants enter the control rooms in a variety of ways, including outdoor ventilation systems, adjacent interior areas, and with individuals entering and exiting the room.

Corrosive Contaminant Risk

Sulfur-bearing gases, such as sulfur dioxide (SO_2) and hydrogen sulfide (H_2S), are the most common gases causing corrosion of electronic equipment. Once introduced into a control room, these gaseous contaminants lead to deterioration of copper surfaces and silver solder used on computer circuit boards, leading to intermittent and hard failures. These forms of corrosion can cause failure by impeding the flow of electricity. Elimination of corrosive contaminants is therefore essential in maintaining data center equipment reliability.

In response to these problems, ISA (Instrumentation, Systems, and Automation Society) developed a standard to classify control rooms and process control environments – ISA 71.04. Most equipment manufacturers require that the control room environment meet the ISA G1 – Mild classification to maintain a reliable communication network in industrial environments.

Optimize Your Environment

Using SAAF Tech Tools, a decision science solution program for configuring gas- phase applications, AAF experts can identify optimal media and equipment solutions. SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem solving experience.

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Additional Solutions You May Be Interested In:
For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Schools and Universities

Extensive Studies Show:

- Students attending schools with poor indoor air quality score **11% lower on standardized tests** than those students attending schools in good condition, according to the U.S. Department of Education's Office of Education Research and Improvement
- A third or more of U.S. schools have **mold, dust, and other indoor air problems** serious enough to provoke respiratory issues like asthma in students and teachers
- An average of one out of every 10 school-age children has asthma, which is a l**eading cause of school absenteeism**
- The economic cost of asthma amounts to more than **$56 billion annually**, including direct medical costs from hospital stays and indirect costs (e.g. lost school and work days)
- Up to **65%** of asthma cases in school-aged children **could be prevented with proper IAQ**

Sources: Creating healthy indoor air quality in schools, U.S. Environmental Protection Agency, www2.epa.gov/iaq-schools; Asthma Facts, U.S. Environmental Protection Agency, Indoor Environments Division, Office of Air and Radiation, August, 2015

Critical Importance of Indoor Air Quality (IAQ)

IAQ is a primary concern for both schools and universities, due in part to the age and overall condition of a number of educational buildings. In 2014, the National Center for Education Statistics surveyed a sample of school districts and estimated that the average age of the nation's main school buildings was 55 years old. Additionally, nearly one-fourth of the nation's schools have one or more buildings in need of extensive repair or replacement, and nearly half have been reported to have problems related to IAQ. Students spend more than 1,300 hours in a school building each year and need to be protected.

The Air Inside These Facilities Can Contain:

- Molds, spores, pollens
- Carbon monoxide, radon, volatile organic compounds (VOCs)
- Bacteria, viruses, and byproducts
- Vehicle engine exhaust, exhaust from industrial plants
- Asbestos, clays, elemental particles, and man-made fibers

The health and comfort of students and teachers are among the many factors that contribute to learning and productivity in the classroom, which in turn affect performance and achievement. In addition, failure to respond promptly and effectively to poor indoor air quality in schools can lead to an increase in long-term health problems, costly repairs, and potential liability problems.

Optimize Your Environment

Quality air filtration system design, operation, and maintenance are critical for providing clean and healthy IAQ in schools. Properly functioning filtration systems clean the air of dirt, dust, pollen, dander, and fibers, control odors, and reduce the pollutants that cause most IAQ problems inside school buildings. In addition to improving occupant health and performance, regular HVAC maintenance also saves energy.

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Additional Solutions You May Be Interested In:

For Information on IAQ, turn to page 3.
For Information on TCO Diagnostic, turn to page 44.

Standard Operating Procedures

Extensive Studies Show:

- **40%** of **drug shortages** resulted from quality concerns while **relying on incorrect SOPs**
- **25%** of **483 Letters** involved lack of **management oversight** as the leading reason
- The FDA has recorded a record-breaking pace for 483's—**issuing 10,000 citations a year, one every 52 minutes**
- **Poor manufacturing quality** is most frequently a result of **poorly executed processes**. It has been reported that you can essentially spend:
  - **$500,000 a year** on compliance, or
  - **$300 million** on an FDA consent decree

Ineffective SOPs Are Cause of FDA 483's

Pharmaceutical manufacturing firms seek to drive profitability and maintain FDA compliance by strictly adhering to a large and complex set of standard operating procedures (SOPs) associated with the successful operation of their cleanrooms.

As the levels of complexity in quality control have risen, so have the number of FDA citations, warning letters, and consent decrees. The number of Pharma companies that have received warning letters, or that are under consent decrees, indicates that poorly structured SOPs are a significant problem in the industry.

Many are unaware that their current SOPs actually have a host of hidden risks and costs associated with them. This is particularly true as it pertains to the selection, installation, and maintenance of their terminal HEPA filtration.

Since 2009, the FDA has made enforcement and compliance operations a top priority. Over the last four years, FDA leadership has actively worked to strengthen the Agency's enforcement policies. As a result, FDA enforcement activities have increased steadily.

Change Demands Continuous Improvement

As recent indicators show, trends in the pharmaceutical industry include new biotech products, more potent products, and more cost effective products and production equipment that necessitate continuous and aggressive upgrades. With the last breakthrough in cleanroom air filtration, microglass media 75 years ago, considering an alternative should be a priority.

ePTFE and Pharma

The benefits of ePTFE filters, including the significant reduction in energy cost, enhanced chemical tolerance, and increased durability, have long been known for critical semiconductor applications. However, until recently, this technology was not available for use in pharmaceutical environments. AAF ePTFE Filtration Technology is specifically designed to retain equivalent amounts of PAO aerosol with a pressure drop that is equivalent or lower than that of microglass. In fact, independent laboratory studies have shown that ePTFE filters possess a far superior PAO holding capacity over traditional microglass HEPA media.

Sources: Expert Briefings, March 2013; Blue Mountain Quality Resources, October 2013; U.S. Food and Drug Administration (FDA), December 2014; The Engelberg Center for Health Care Reform at Brookings, May 2014

Additional Solutions You May Be Interested In:
For Information on MEGAcel II, turn to page 128 & 129.
For Information on TCO Diagnostic, turn to page 44.

Transportation

Poor Intake Air Quality Can:

- Reduce engine performance
- Create higher fuel consumption
- Increase exhaust fumes

Corrosive Contaminant Risk

For diesel engines, contaminants and particulates in the air such as fumes, dust, and smog can lead to severe damage of engine components. The air that these engines “breathe” needs to be as clean as possible. Poor intake air quality can reduce engine performance, create higher fuel consumption, and increase exhaust fumes.

Optimize Your Environment

Constructed from two layers of glass fiber media, AAF’s AmerKleen filter provides an extremely high dust holding capacity, allowing it to remain in service longer than most other intake air filters. With this long service life, low resistance, and high filtration efficiency, the AmerKleen filter provides an excellent filtration solution for the scheduled engine maintenance cycle. This results in extended engine life and reduced life cycle costs. AAF is one of a few producers of this nonflammable glass fiber media, as well as the prime supplier of the AmerKleen cartridge housing.

Additional Products & Solutions You May Be Interested In:

For Information on AmerKleen M80 pads, turn to page 78.

Wastewater Treatment

Corrosive Contaminant Risk

Not only is hydrogen sulfide potentially dangerous at high concentrations, but electronic corrosion at these plants can occur when corrosive, acidic gases attack sensitive computer controls and other critical electronics that affect the reliability of plant processes.

If Not Controlled, Corrosion Leads To:

- Blocked currents
- Brittle connection points
- Overheated systems
- Costly repairs
- Failed boards in control systems
- Plant downtime
- Reduced production efficiency in compressed air systems and increased maintenance costs

Critical Importance of Air Quality

Control rooms are utilized by large-scale wastewater treatment plants to monitor and control plant operations. The control room and network of control equipment are essential to plant operation and enable these plants to maintain the highest efficiency possible. If the control room malfunctions, it can cost a plant tens of thousands of dollars per hour.

Particulate and corrosive gaseous contaminants have become a serious problem for these control rooms, sometimes resulting in catastrophic failures of equipment. These contaminants enter the control rooms in a variety of ways, including outdoor ventilation systems, adjacent interior areas, and with individuals entering and exiting the room.

Dangerous Odors

Industrial wastewater treatment generates odors that can be strong, persistent, and a nuisance to employees, residents, businesses, and industries located near the wastewater treatment plant. Strong odors develop at several areas within a wastewater treatment facility, such as headworks, primary clarifiers, pump stations, and sewage sludge areas. Nuisance odors often emerge from the following sources: combined sewer overflow (BTEX, TCE, and other VOCs); industrial sewage (benzene, industrial chemical effluents such as amines, and other VOCs); and residential sewage (ammonia, hydrogen sulfide, and mercaptans).

Optimize Your Environment

Using SAAF Tech Tools, a decision science solution program for configurin gas-phase applications, AAF experts can identify optimal media and equipment solutions. SAAF Tech Tools simplifies the complexities surrounding gas-phase applications through a guided problem solving experience.

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Additional Solutions You May Be Interested In:

For Information on SAAF Tech Tools, turn to page 47.
For Information on TCO Diagnostic, turn to page 44.

Wildfire Pollutants Control

Extensive Studies Show:

- Two-thirds of the US, **nearly 212 million people**, live in counties beset by wildfire smoke
- For places that had medium- to high-density smoke for at least 12 days, the smoke covered an area **nearly 50 times larger** than the areas directly burned by the fire

The Threat from Wildfires—Hundreds of Miles Away

Smoke plumes can carry dangerous gases and toxins hundreds or thousands of miles, exposing hundreds of millions of Americans each fire season to harmful particulates. The National Weather Service's Grand Rapids station noted a number of residents in the southern Lower Peninsula of Michigan reported smelling the smoke from the wildfires that recently destroyed more than 150 homes and businesses in Gatlinburg and Pigeon Forge, Tennessee, some 600 miles or more away.

The wide variety of pollutants released by wildland fire includes:

- greenhouse gases (carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)
- photochemically reactive compounds
  - carbon monoxide (CO)
  - nonmethane volatile organic carbon (NMVOC)
  - nitrogen oxides (NOx)
- fine and coarse particulate matter (PM)
- light hydrocarbons and polycyclic aromatic hydrocarbons (PAH)
- ammonia (NH_3)
- peroxides
- chlorine and bromine compounds

Now is the Time to Be Proactive

AAF can protect your environment from exposure and reduce your risk from the affects of wildfire smoke with our high efficiency carbon filters. Carbon filters are designed to improve indoor air quality through the effective removal of indoor and outdoor particulate and harmful gaseous contaminants.

Available solutions include:

- Highest activity carbon = highest adsorption
- Energy efficient mini-pleat design
- High capacity disposal filter options
- Retrofit into existing HVAC systems
- Economical solutions available for gaseous contaminant problems including odors

Source: Alisa Opar, Smoke Gets in Your Eyes (From Distant Flames), National Resources Defense Council, August 2015; National Resources Defense Council (NRDC) analysis, 2011; Kim Knowlton, Up in smoke: stifling heat, wildfires and the toll on human health, National Resources Defense Council, September 2014; Keith Matheny, Smell of Tennessee wildfire smoke reaches lower Michigan, Detroit Free Press, November 29, 2016; H. Ammann et al.,Wildfire Smoke: A Guide for Public Health Officials, Environmental Protection Agency, 2001

Additional Products & Solutions You May Be Interested In:

For Information on SAAF Tech Tools, turn to page 47.

Media (Pads & Rolls)

AmerTex R-Series

Product Overview

- Low initial resistance
- High dust holding capacity
- Water washable

Specification

EN779	G2, G3, G4
ASHRAE 52.2	MERV 4, 5, 7
Media Type	Synthetic
Antimicrobial Available	No
Recommended Final Resistance	250 Pa
Max Operating Temperature	100°C
Air Filtration Certificate	DIN 53438 F1

Product Information

Part Number	Model	Dimension	EN779	ASHRAE 52.2	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T900-222-015P	R-15	2m x 20m x 15 mm	G2	MERV 4	1.5	17
T900-222-029P	R-29	2m x 20m x 20 mm	G3	MERV 5		26
T900-222-050P	R-50	2m x 20m x 20 mm	G4	MERV 7		42

AmerTex F-Series

Product Overview

- Fire retardant media, F1/K1 according to DIN 53438
- F series comes with special woven scrim on the air leaving side gives sturdiness to prevent particle migration
- F60 is impregnated with tackifier adhesive to retain particles during vibration
- F series is designed for paint spray booth

Specification

EN779	M5
ASHRAE 52.2	MERV 9
Media Type	Synthetic
Antimicrobial Available	No
Recommended Final Resistance	450 Pa
Max Operating Temperature	100°C
Air Filtration Certificate	DIN 53438 F1/K1

Product Information

Part Number	Model	Dimension	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T900-220-030H	F-30	2m x 20m x 22 mm	0.25	25
T900-220-060H	F-60	2m x 20m x 22 mm		

AmerKleen M80

Product Overview

- Glass fibre pad with progressive density
- Strong resilient design
- Economical to use
- Disposable

Specification

EN779	G3
ASHRAE 52.2	MERV 5
Filter Depth (mm)	95 - 100
Media Type	Fibreglass
Recommended Final Resistance	250 Pa
Max Operating Temperature	100°C - 170°C
Air Filtration Certificate	DIN 53438 – 3*

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T151-804-001*	24 x 24 x 4	616 x 616 x 95	2.5	75
T151-805-002	24 x 24 x 4	610 x 610 x 100	2.5	75

AmerKool M81 - Mist Eliminator

Product Overview

- Heavy-duty
- Operates at a low pressure drop
- Water resistant media
- Progressive density
- Economical to use
- Disposable

Specification

Filter Depth (mm)	75
Media Type	Fibreglass
Recommended Final Resistance	250 Pa
Max Operating Temperature	100°C
Air Filtration Certificate	DIN 53438 – 3

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T151-813-001	25 x 25 x 3	641 x 641 x 75	2.5	50

AG-28 Paint Arrestor

Product Overview

- Effectively removes paint oversprays solids of all types lacquer
- Protect exhaust ducts, fans and motors from paint build-up
- Clean exhaust air is discharged to atmosphere
- Economical to use
- Disposable

Specification

Filter Depth (mm)	50
Media Type	Fibreglass
Max Operating Temperature	170°C

Product Information

Part Number	Type	Nominal Size (Inches)	Actual Size (mm)	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T150-005-228	Pad	24 x 24 x 2	610 x 610 x 50	2.5	50
T150-100-228	Roll	40 x 1020 x 2	1000 x 25,900 x 50		

Roll-O-Mat Gold

Product Overview

- Available in widths and on cores for all manufacturers' roll filters
- 50 mm thick media of continuous filament fibreglass
- Economical to use
- Disposable

Specification

Arrestance	70 - 85%
Filter Depth (mm)	50
Media Type	Fibreglass
Maximum Operating Temperature	170°C

Product Information

Part Number	Nominal Roll Size (ft.)	Actual Size (mm)	Face Velocity (m/s)	Rated Initial Resistance (Pa)
T800-327-300	3 x 65	898 x 19,800	2.5	50
T800-447-300	4 x 65	1203 x 19,800		
T800-567-300	5 x 65	1508 x 19,800		
T800-687-300	6 x 65	1813 x 19,800		

Panel & Pleated Filters

6000

Product Overview

- Designed for heavy loading conditions
- More dirt-catching media surface area
- Progressive density media construction
- High compression strength
- Environmental friendly

Specification

EN779	G3
ASHRAE 52.2	MERV 5
Filter Depth (mm)	22, 44
Media Type	Fibreglass
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	250 Pa
Max Operating Temperature	65°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M206-500-551	16 x 20 x 1	391 x 492 x 22	1,125	20
M206-700-551	20 x 20 x 1	492 x 492 x 22	1,410	
M206-319-551	12 x 24 x 1	289 x 594 x 22	1,020	
M206-782-551	20 x 24 x 1	492 x 594 x 22	1,695	
M206-863-551	24 x 24 x 1	594 x 594 x 22	2,040	
M206-600-551	16 x 25 x 1	391 x 619 x 22	1,410	
M206-800-551	20 x 25 x 1	492 x 619 x 22	1,765	
44 mm				
M206-500-552	16 x 20 x 2	391 x 492 x 44	1,860	63
M206-700-552	20 x 20 x 2	492 x 492 x 44	2,320	
M206-319-552	12 x 24 x 2	289 x 594 x 44	1,700	
M206-782-552	20 x 24 x 2	492 x 594 x 44	2,800	
M206-863-552	24 x 24 x 2	594 x 594 x 44	3,400	
M206-600-552	16 x 25 x 2	391 x 619 x 44	2,320	
M206-800-552	20 x 25 x 2	492 x 619 x 44	2,900	

Permanent Metal Air Filter

Product Overview

- Aluminium frame
- Reduces maintenance cost
- Low resistance against airflow
- Long service life
- Easy to clean and install
- Effective grease removal

Specification

Filter Depth (mm)	22, 46, 97
Media Type	Aluminium
Frame Material (Standard)	Aluminium
Frame Material (Optional)	Galvanised Steel , Stainless Steel
Faceguard Position	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	250 Pa
Max Operating Temperature	300°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
T999-121-319	12 x 24 x 1	289 x 594 x 22	1,700	18
T999-121-782	20 x 24 x 1	492 x 594 x 22	2,830	
T999-121-863	24 x 24 x 1	594 x 594 x 22	3,400	
46 mm				
T999-123-319	12 x 24 x 2	289 x 594 x 46	1,700	28
T999-123-782	20 x 24 x 2	492 x 594 x 46	2,830	
T999-123-863	24 x 24 x 2	594 x 594 x 46	3,400	
97 mm				
T999-124-319	12 x 24 x 4	289 x 594 x 97	1,700	41
T999-124-782	20 x 24 x 4	492 x 594 x 97	2,830	
T999-124-863	24 x 24 x 4	594 x 594 x 97	3,400	

ChevroNet

Product Overview

- Economical pre-filter
- Suitable for high humidity conditions
- Reusable filter frame
- Replaceable filter media
- Lightweight and compact size

Specification

EN779	G2, G3, G4
ASHRAE 52.2	MERV 4, 5, 7
ISO 16890	Coarse 40%, 60%, 70%
Filter Depth (mm)	44, 95
Media Type	Synthetic
Frame Material	Galvanised Steel
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	250 Pa
Max Operating Temperature	100°C

Product Information

Part Number	Media	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
G2 / MERV 4 / Coarse 40%					
M200-128-027	R15	12 x 24 x 2	289 x 594 x 44	1,700	55
M200-128-026		20 x 24 x 2	492 x 594 x 44	2,830	
M200-128-025		24 x 24 x 2	594 x 594 x 44	3,400	
M200-148-035		12 x 24 x 4	289 x 594 x 95	1,700	60
M200-148-034		20 x 24 x 4	492 x 594 x 95	2,830	
M200-148-033		24 x 24 x 4	594 x 594 x 95	3,400	
G3 / MERV 5 / Coarse 60%					
M200-228-029	R29	12 x 24 x 2	289 x 594 x 44	1,700	83
M200-228-028		20 x 24 x 2	492 x 594 x 44	2,830	
M200-228-015		24 x 24 x 2	594 x 594 x 44	3,400	
M200-248-038		12 x 24 x 4	289 x 594 x 95	1,700	72
M200-248-037		20 x 24 x 4	492 x 594 x 95	2,830	
M200-248-036		24 x 24 x 4	594 x 594 x 95	3,400	
G4 / MERV 7 / Coarse 70%					
M200-528-032	R50	12 x 24 x 2	289 x 594 x 44	1,700	105
M200-528-031		20 x 24 x 2	492 x 594 x 44	2,830	
M200-528-030		24 x 24 x 2	594 x 594 x 44	3,400	
M200-548-041		12 x 24 x 4	289 x 594 x 95	1,700	75
M200-548-040		20 x 24 x 4	492 x 594 x 95	2,830	
M200-548-039		24 x 24 x 4	594 x 594 x 95	3,400	

AmWash

Product Overview

- Economical pre-filter
- Suitable for high humidity conditions
- Reusable filter frame
- Replaceable filter media
- Lightweight and compact size

Specification

EN779	G3, G4
ASHRAE 52.2	MERV 5, 7
ISO 16890	Coarse 60%, 70%
Filter Depth (mm)	46, 97
Media Type	Synthetic
Frame Material	Aluminium
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	250 Pa
Max Operating Temperature	100°C

Product Information

Part Number	Media	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
G3 / MERV 5 / Coarse 60%					
T111-292-021	R29	16 x 20 x 2	391 x 492 x 46	1,890	83
T111-292-015		20 x 20 x 2	492 x 492 x 46	2,360	
T111-292-006		12 x 24 x 2	289 x 594 x 46	1,700	
T111-292-005		20 x 24 x 2	492 x 594 x 46	2,830	
T111-292-004		24 x 24 x 2	594 x 594 x 46	3,400	
T111-292-088		16 x 25 x 2	391 x 619 x 46	2,360	
T111-292-068		20 x 25 x 2	492 x 619 x 46	2,950	
T111-294-016		16 x 20 x 4	391 x 492 x 97	1,890	72
T111-294-004		20 x 20 x 4	492 x 492 x 97	2,360	
T111-294-003		12 x 24 x 4	289 x 594 x 97	1,700	
T111-294-002		20 x 24 x 4	492 x 594 x 97	2,830	
T111-294-001		24 x 24 x 4	594 x 594 x 97	3,400	
T111-294-017		16 x 25 x 4	391 x 619 x 97	2,360	
T111-294-018		20 x 25 x 4	492 x 619 x 97	2,950	
G4 / MERV 7 / Coarse 70%					
T111-502-062	R50	16 x 20 x 2	391 x 492 x 46	1,890	105
T111-502-015		20 x 20 x 2	492 x 492 x 46	2,360	
T111-502-003		12 x 24 x 2	289 x 594 x 46	1,700	
T111-502-004		20 x 24 x 2	492 x 594 x 46	2,830	
T111-502-002		24 x 24 x 2	594 x 594 x 46	3,400	
T111-502-020		16 x 25 x 2	391 x 619 x 46	2,360	
T111-502-136		20 x 25 x 2	492 x 619 x 46	2,950	
T111-504-037		16 x 20 x 4	391 x 492 x 97	1,890	75
T111-504-004		20 x 20 x 4	492 x 492 x 97	2,360	
T111-504-003		12 x 24 x 4	289 x 594 x 97	1,700	
T111-504-002		20 x 24 x 4	492 x 594 x 97	2,830	
T111-504-001		24 x 24 x 4	594 x 594 x 97	3,400	
T111-504-038		16 x 25 x 4	391 x 619 x 97	2,360	
T111-504-031		20 x 25 x 4	492 x 619 x 97	2,950	

AmAir

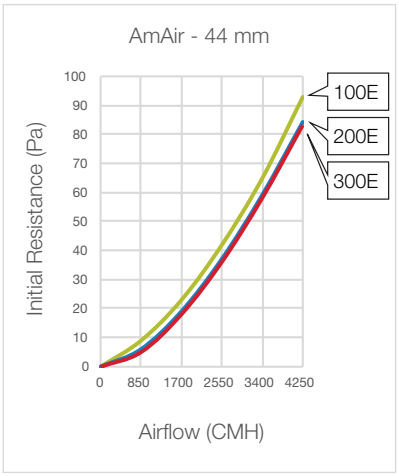
Product Overview

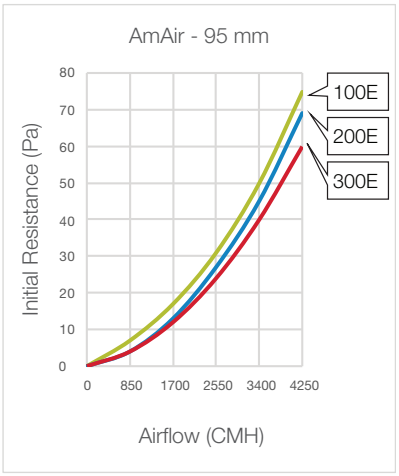
- Excellent as a pre-filter
- Disposable pleated filter
- Wide selection range
- High loft media increases dust holding capacity
- Expanded metal support grid increases the stability of the pleat pack

Specification

EN 779	G4
ASHRAE 52.2	MERV 7
ISO 16890	Coarse 70%
Filter Depth (mm)	22, 44, 95
Media Type	Non-Woven Cotton Synthetic Blend
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recommended Final Resistance	250 Pa
Max Operating Temperature	93°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow





Product Information

Part Number	Media	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm					
M142-201-500	100E	16 x 20 x 1	391 x 492 x 22	1,890	102
M142-201-700		20 x 20 x 1	492 x 492 x 22	2,360	
M142-201-319		12 x 24 x 1	289 x 594 x 22	1,700	
M142-201-782		20 x 24 x 1	492 x 594 x 22	2,830	
M142-201-863		24 x 24 x 1	594 x 594 x 22	3,400	
M142-201-600		16 x 25 x 1	391 x 619 x 22	2,360	
44 mm					
M142-202-500	100E	16 x 20 x 2	391 x 492 x 44	1,890	65
M142-202-700		20 x 20 x 2	492 x 492 x 44	2,360	
M142-202-319		12 x 24 x 2	289 x 594 x 44	1,700	
M142-202-782		20 x 24 x 2	492 x 594 x 44	2,830	
M142-202-863		24 x 24 x 2	594 x 594 x 44	3,400	
M142-202-600		16 x 25 x 2	391 x 619 x 44	2,360	
95 mm					
M142-204-500	100E	16 x 20 x 4	391 x 492 x 95	1,890	50
M142-204-700		20 x 20 x 4	492 x 492 x 95	2,360	
M142-204-319		12 x 24 x 4	289 x 594 x 95	1,700	
M142-204-782		20 x 24 x 4	492 x 594 x 95	2,830	
M142-204-863		24 x 24 x 4	594 x 594 x 95	3,400	
M142-204-600		16 x 25 x 4	391 x 619 x 95	2,360	

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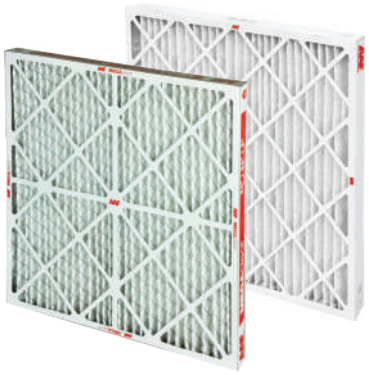
Product Information

Part Number	Media	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm					
M146-201-500	200E	16 x 20 x 1	391 x 492 x 22	1,890	98
M146-201-700		20 x 20 x 1	492 x 492 x 22	2,360	
M146-201-319		12 x 24 x 1	289 x 594 x 22	1,700	
M146-201-782		20 x 24 x 1	492 x 594 x 22	2,830	
M146-201-863		24 x 24 x 1	594 x 594 x 22	3,400	
M146-201-600		16 x 25 x 1	391 x 619 x 22	2,360	
44 mm					
M146-202-500	200E	16 x 20 x 2	391 x 492 x 44	1,890	59
M146-202-700		20 x 20 x 2	492 x 492 x 44	2,360	
M146-202-319		12 x 24 x 2	289 x 594 x 44	1,700	
M146-202-782		20 x 24 x 2	492 x 594 x 44	2,830	
M146-202-863		24 x 24 x 2	594 x 594 x 44	3,400	
M146-202-600		16 x 25 x 2	391 x 619 x 44	2,360	
95 mm					
M146-204-500	200E	16 x 20 x 4	391 x 492 x 95	1,890	45
M146-204-700		20 x 20 x 4	492 x 492 x 95	2,360	
M146-204-319		12 x 24 x 4	289 x 594 x 95	1,700	
M146-204-782		20 x 24 x 4	492 x 594 x 95	2,830	
M146-204-863		24 x 24 x 4	594 x 594 x 95	3,400	
M146-204-600		16 x 25 x 4	391 x 619 x 95	2,360	
22 mm					
M140-201-500	300E	16 x 20 x 1	391 x 492 x 22	1,890	95
M140-201-700		20 x 20 x 1	492 x 492 x 22	2,360	
M140-201-319		12 x 24 x 1	289 x 594 x 22	1,700	
M140-201-782		20 x 24 x 1	492 x 594 x 22	2,830	
M140-201-863		24 x 24 x 1	594 x 594 x 22	3,400	
M140-201-600		16 x 25 x 1	391 x 619 x 22	2,360	
44 mm					
M140-202-500	300E	16 x 20 x 2	391 x 492 x 44	1,890	58
M140-202-700		20 x 20 x 2	492 x 492 x 44	2,360	
M140-202-319		12 x 24 x 2	289 x 594 x 44	1,700	
M140-202-782		20 x 24 x 2	492 x 594 x 44	2,830	
M140-202-863		24 x 24 x 2	594 x 594 x 44	3,400	
M140-202-600		16 x 25 x 2	391 x 619 x 44	2,360	
95 mm					
M140-204-500	300E	16 x 20 x 4	391 x 492 x 95	1,890	40
M140-204-700		20 x 20 x 4	492 x 492 x 95	2,360	
M140-204-319		12 x 24 x 4	289 x 594 x 95	1,700	
M140-204-782		20 x 24 x 4	492 x 594 x 95	2,830	
M140-204-863		24 x 24 x 4	594 x 594 x 95	3,400	
M140-204-600		16 x 25 x 4	391 x 619 x 95	2,360	

MEGApleat M8 / SC

Product Overview

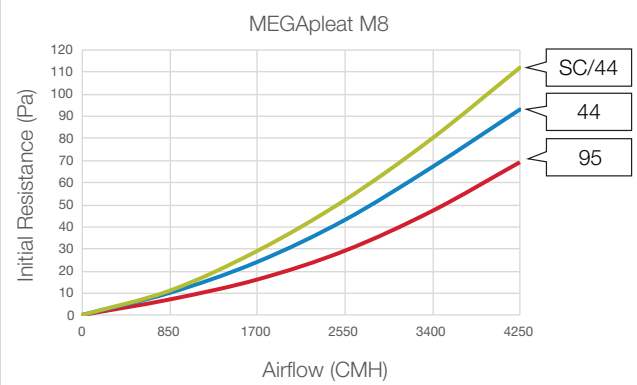
- Excellent as a pre-filter
- Low operational resistance reduces energy consumption
- Highest dust holding capacity
- The most durable frame construction
- Guaranteed consistent performance
- Patent-pending filter design
- Heavy-duty, galvanised expanded metal support grid
- Also available is the most cost-effective variant



Specification

EN779	G4
ASHRAE 52.2	MERV 8
ISO 16890	Coarse 60%
Filter Depth (mm)	22, 44, 95
Media Type	Synthetic
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recomm. Final Resistance	250 Pa
Max Operating Temperature	93°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

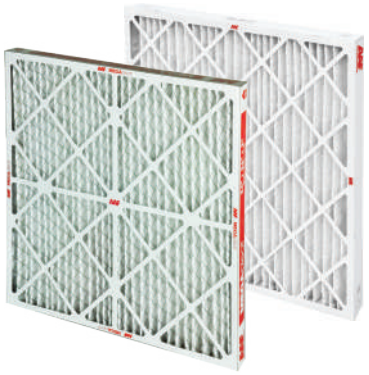
Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M148-801-500	16 x 20 x 1	391 x 492 x 22	1,890	115
M148-801-700	20 x 20 x 1	492 x 492 x 22	2,360	
M148-801-319	12 x 24 x 1	289 x 594 x 22	1,700	
M148-801-782	20 x 24 x 1	492 x 594 x 22	2,830	
M148-801-863	24 x 24 x 1	594 x 594 x 22	3,400	
44 mm				
M148-802-500	16 x 20 x 2	391 x 492 x 44	1,890	67
M148-802-700	20 x 20 x 2	492 x 492 x 44	2,360	
M148-802-319	12 x 24 x 2	289 x 594 x 44	1,700	
M148-802-782	20 x 24 x 2	492 x 594 x 44	2,830	
M148-802-863	24 x 24 x 2	594 x 594 x 44	3,400	
44 mm SC*				
M248-802-319	12 x 24 x 2	289 x 594 x 44	1,700	80
M248-802-863	24 x 24 x 2	594 x 594 x 44	3,400	
95 mm				
M148-804-500	16 x 20 x 4	391 x 492 x 95	1,890	47
M148-804-700	20 x 20 x 4	492 x 492 x 95	2,360	
M148-804-319	12 x 24 x 4	289 x 594 x 95	1,700	
M148-804-782	20 x 24 x 4	492 x 594 x 95	2,830	
M148-804-863	24 x 24 x 4	594 x 594 x 95	3,400	

**Non UL compliant.*

MEGApleat M11 / SC

Product Overview

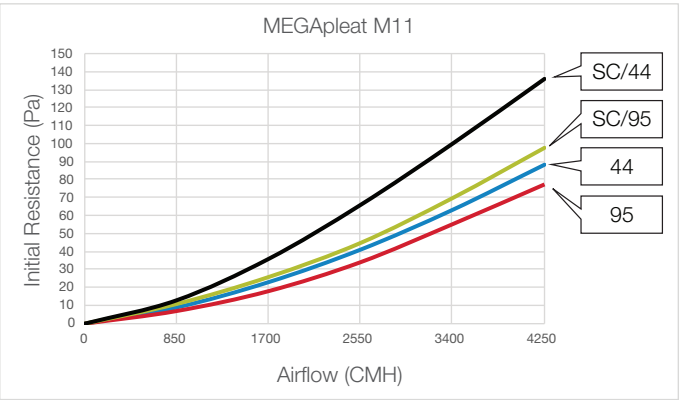
- Excellent as a secondary filter
- Low operational resistance reduces energy consumption
- Highest dust holding capacity
- The most durable frame construction
- Guaranteed consistent performance
- Patent-pending filter design
- Heavy-duty, galvanised expanded metal support grid
- Also available is the most cost-effective variant



Specification

EN779	M6
ASHRAE 52.2	MERV 11
ISO 16890	ePM10 55%
Filter Depth (mm)	22, 44, 95
Media Type	Synthetic
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recomm. Final Resistance	250 Pa
Max Operating Temperature	93°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

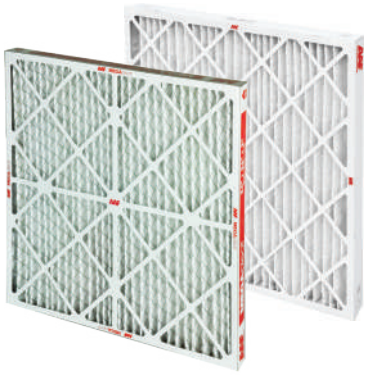
Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M145-111-500	16 x 20 x 1	391 x 492 x 22	1,890	117
M145-111-700	20 x 20 x 1	492 x 492 x 22	2,360	
M145-111-319	12 x 24 x 1	289 x 594 x 22	1,700	
M145-111-782	20 x 24 x 1	492 x 594 x 22	2,830	
M145-111-863	24 x 24 x 1	594 x 594 x 22	3,400	
44 mm				
M145-112-500	16 x 20 x 2	391 x 492 x 44	1,890	63
M145-112-700	20 x 20 x 2	492 x 492 x 44	2,360	
M145-112-319	12 x 24 x 2	289 x 594 x 44	1,700	
M145-112-782	20 x 24 x 2	492 x 594 x 44	2,830	
M145-112-863	24 x 24 x 2	594 x 594 x 44	3,400	
44 mm SC*				
M245-112-319	12 x 24 x 2	289 x 594 x 44	1,700	100
M245-112-863	24 x 24 x 2	594 x 594 x 44	3,400	
95 mm				
M145-114-500	16 x 20 x 4	391 x 492 x 95	1,890	55
M145-114-700	20 x 20 x 4	492 x 492 x 95	2,360	
M145-114-319	12 x 24 x 4	289 x 594 x 95	1,700	
M145-114-782	20 x 24 x 4	492 x 594 x 95	2,830	
M145-114-863	24 x 24 x 4	594 x 594 x 95	3,400	
95 mm SC*				
M245-114-319	12 x 24 x 4	289 x 594 x 95	1,700	70
M245-114-863	24 x 24 x 4	594 x 594 x 95	3,400	

**Non UL compliant.*

MEGApleat M13 / SC

Product Overview

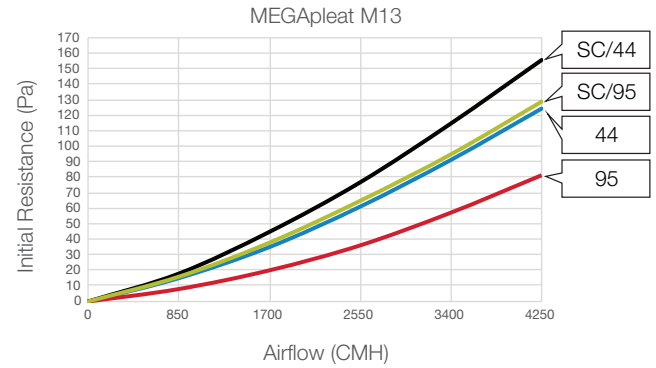
- Excellent as a secondary filter
- Low operational resistance reduces energy consumption
- Highest dust holding capacity
- The most durable frame construction
- Guaranteed consistent performance
- Patent-pending filter design
- Heavy-duty, galvanised expanded metal support grid
- Also available is the most cost-effective variant



Specification

EN779	F7
ASHRAE 52.2	MERV 13
ISO 16890	ePM10 70%
Filter Depth (mm)	22, 44, 95
Media Type	Synthetic
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recomm. Final Resistance	250 Pa
Max Operating Temperature	93°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M143-301-500	16 x 20 x 1	391 x 492 x 22	1,890	132
M143-301-700	20 x 20 x 1	492 x 492 x 22	2,360	
M143-301-319	12 x 24 x 1	289 x 594 x 22	1,700	
M143-301-782	20 x 24 x 1	492 x 594 x 22	2,830	
M143-301-863	24 x 24 x 1	594 x 594 x 22	3,400	
44 mm				
M143-302-500	16 x 20 x 2	391 x 492 x 44	1,890	91
M143-302-700	20 x 20 x 2	492 x 492 x 44	2,360	
M143-302-319	12 x 24 x 2	289 x 594 x 44	1,700	
M143-302-782	20 x 24 x 2	492 x 594 x 44	2,830	
M143-302-863	24 x 24 x 2	594 x 594 x 44	3,400	
44 mm SC*				
M243-302-319	12 x 24 x 2	289 x 594 x 44	1,700	115
M243-302-863	24 x 24 x 2	594 x 594 x 44	3,400	
95 mm				
M143-304-500	16 x 20 x 4	391 x 492 x 95	1,890	57
M143-304-700	20 x 20 x 4	492 x 492 x 95	2,360	
M143-304-319	12 x 24 x 4	289 x 594 x 95	1,700	
M143-304-782	20 x 24 x 4	492 x 594 x 95	2,830	
M143-304-863	24 x 24 x 4	594 x 594 x 95	3,400	
95 mm SC*				
M243-304-319	12 x 24 x 4	289 x 594 x 95	1,700	95
M243-304-863	24 x 24 x 4	594 x 594 x 95	3,400	

**Non UL compliant.*

PREpleat LPD SC

Product Overview

- Low resistance MERV 8 media
- High Dust Holding Capacity (DHC) media outperforms competitor's Standard Capacity filters
- Diagonal support members and wire-backed media contribute to overall strength of construction
- Filter media pack is bonded to the frame at all points of contact to eliminate air bypass

Specification

EN779	G4
ASHRAE 52.2	MERV 8
ISO 16890	Coarse 70%
Filter Depth (mm)	22, 44, 95
Media Type	Synthetic
Frame Material	Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recommended Filter Resistance	250 Pa
Max Operating Temperature	82°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M147-101-500	16 x 20 x 1	391 x 492 x 22	1,860	62
M147-101-700	20 x 20 x 1	492 x 492 x 22	2,320	
M147-101-319	12 x 24 x 1	289 x 594 x 22	1,700	
M147-101-782	20 x 24 x 1	492 x 594 x 22	2,800	
M147-101-863	24 x 24 x 1	594 x 594 x 22	3,400	
M147-101-600	16 x 25 x 1	391 x 619 x 22	2,320	
M147-101-800	20 x 25 x 1	492 x 619 x 22	2,900	
44 mm				
M147-102-500	16 x 20 x 2	391 x 492 x 44	1,860	46
M147-102-700	20 x 20 x 2	492 x 492 x 44	2,320	
M147-102-319	12 x 24 x 2	289 x 594 x 44	1,700	
M147-102-782	20 x 24 x 2	492 x 594 x 44	2,800	
M147-102-863	24 x 24 x 2	594 x 594 x 44	3,400	
M147-102-600	16 x 25 x 2	391 x 619 x 44	2,320	
M147-102-800	20 x 25 x 2	492 x 619 x 44	2,900	
95 mm				
M147-104-500	16 x 20 x 4	391 x 492 x 95	1,860	40
M147-104-700	20 x 20 x 4	492 x 492 x 95	2,320	
M147-104-319	12 x 24 x 4	289 x 594 x 95	1,700	
M147-104-782	20 x 24 x 4	492 x 594 x 95	2,800	
M147-104-863	24 x 24 x 4	594 x 594 x 95	3,400	
M147-104-600	16 x 25 x 4	391 x 619 x 95	2,320	
M147-104-800	20 x 25 x 4	492 x 619 x 95	2,900	

PREpleat LPD HC

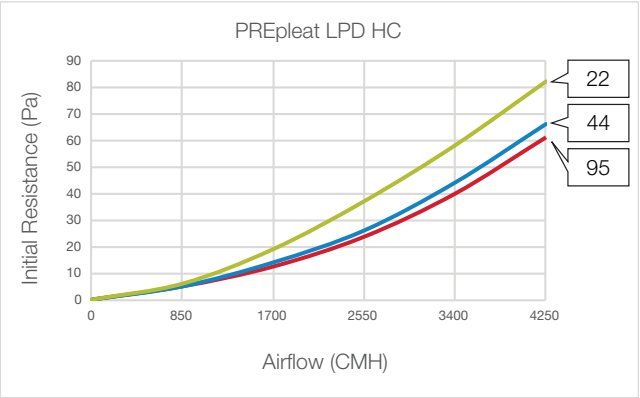
Product Overview

- Lowest initial resistance MERV 8 pleated filter
- High Dust Holding Capacity (DHC) for energy efficient performance
- Diagonal support members and wire-backed media contribute to overall strength of construction
- Filter media pack is bonded to the frame at all points of contact to eliminate air bypass
- High Capacity, MERV 8

Specification

EN779	G4
ASHRAE 52.2	MERV 8
ISO 16890	Coarse 70%
Filter Depth (mm)	22, 44, 95
Media Type	Synthetic
Frame Material	Beverage Board
Special Size Available	Yes
Antimicrobial Available	Optional
Recommended Filter Resistance	250 Pa
Max Operating Temperature	82°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
22 mm				
M147-201-500	16 x 20 x 1	391 x 492 x 22	1,860	58
M147-201-700	20 x 20 x 1	492 x 492 x 22	2,320	
M147-201-319	12 x 24 x 1	289 x 594 x 22	1,700	
M147-201-782	20 x 24 x 1	492 x 594 x 22	2,800	
M147-201-863	24 x 24 x 1	594 x 594 x 22	3,400	
M147-201-600	16 x 25 x 1	391 x 619 x 22	2,320	
M147-201-800	20 x 25 x 1	492 x 619 x 22	2,900	
44 mm				
M147-202-500	16 x 20 x 2	391 x 492 x 44	1,860	44
M147-202-700	20 x 20 x 2	492 x 492 x 44	2,320	
M147-202-319	12 x 24 x 2	289 x 594 x 44	1,700	
M147-202-782	20 x 24 x 2	492 x 594 x 44	2,800	
M147-202-863	24 x 24 x 2	594 x 594 x 44	3,400	
M147-202-600	16 x 25 x 2	391 x 619 x 44	2,320	
M147-202-800	20 x 25 x 2	492 x 619 x 44	2,900	
95 mm				
M147-204-500	16 x 20 x 4	391 x 492 x 95	1,860	40
M147-204-700	20 x 20 x 4	492 x 492 x 95	2,320	
M147-204-319	12 x 24 x 4	289 x 594 x 95	1,700	
M147-204-782	20 x 24 x 4	492 x 594 x 95	2,800	
M147-204-863	24 x 24 x 4	594 x 594 x 95	3,400	
M147-204-600	16 x 25 x 4	391 x 619 x 95	2,320	
M147-204-800	20 x 25 x 4	492 x 619 x 95	2,900	

VariCel S20

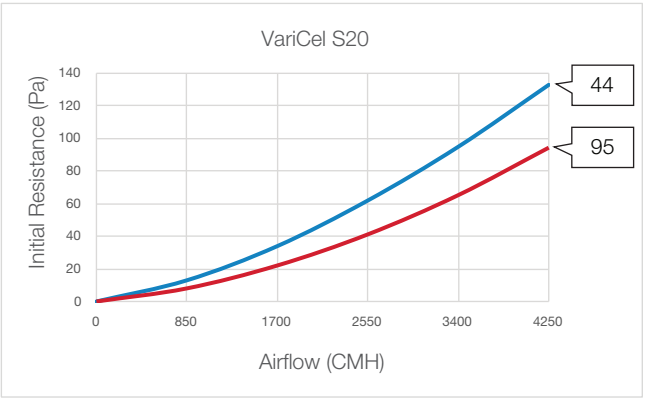
Product Overview

- Economical, evaluated performance and construction
- Engineered for a variety of application
- High dust holding capacity
- Improved efficiency to better protect HVAC coil and high efficiency filters
- Heavy-duty, galvanized expanded metal support grid
- Moisture-resistant beverage board
- Available in 2” and 4” models
- MERV 14 high-capacity filter
- Easy disposal

Specification

ASHRAE 52.2	MERV 14
Filter Depth (mm)	44, 95
Media Type	Synthetic
Frame Material (Standard)	Moisture Resistant Beverage Board
Frame Material (Optional)	Stainless Steel, Aluminum, GI
Special Size Available	Yes
Antimicrobial Available	Optional
Recommended Filter Resistance	250 Pa
Max Operating Temperature	93°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
44 mm				
M154-202-500	16 x 20 x 2	391 x 492 x 44	1,860	95
M154-202-700	20 x 20 x 2	492 x 492 x 44	2,320	
M154-202-319	12 x 24 x 2	289 x 594 x 44	1,700	
M154-202-782	20 x 24 x 2	492 x 594 x 44	2,800	
M154-202-863	24 x 24 x 2	594 x 594 x 44	3,400	
M154-202-600	16 x 25 x 2	391 x 619 x 44	2,320	
M154-202-800	20 x 25 x 2	492 x 619 x 44	2,900	
95 mm				
M154-204-500	16 x 20 x 4	391 x 492 x 95	1,860	65
M154-204-700	20 x 20 x 4	492 x 492 x 95	2,320	
M154-204-319	12 x 24 x 4	289 x 594 x 95	1,700	
M154-204-782	20 x 24 x 4	492 x 594 x 95	2,800	
M154-204-863	24 x 24 x 4	594 x 594 x 95	3,400	
M154-204-600	16 x 25 x 4	391 x 619 x 95	2,320	
M154-204-800	20 x 25 x 4	492 x 619 x 95	2,900	

Repleatz

Product Overview

- Most economical pre-filter
- Reusable filter frame
- Replaceable filter media
- High dust loading capacity
- Low operating resistance saves energy
- Heavy-duty, galvanised expanded metal support grid

Specification

EN779	G4
ASHRAE 52.2	MERV 8
Filter Depth (mm)	22, 46
Media Type	Synthetic
Frame Material (Standard)	Aluminium
Frame Material (Optional)	Stainless Steel, GI
GI Wire Mesh	Downstream (ALS)
Special Size Available	Yes
Recommended Filter Resistance	250 Pa
Max Operating Temperature	82°C, 93°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
HC				
M158-20211-319	12 x 24 x 1	289 x 594 x 22	1,700	59
M158-20211-863	24 x 24 x 1	594 x 594 x 22	3,400	
M158-20212-319	12 x 24 x 2	289 x 594 x 46	1,700	45
M158-20212-863	24 x 24 x 2	594 x 594 x 46	3,400	
M8				
M158-80211-319	12 x 24 x 1	289 x 594 x 22	1,700	115
M158-80211-863	24 x 24 x 1	594 x 594 x 22	3,400	
M158-80212-319	12 x 24 x 2	289 x 594 x 46	1,700	67
M158-80212-863	24 x 24 x 2	594 x 594 x 46	3,400	

Replacement Pleated Media Pack Only

Part Number	Actual Filter Frame Size mm (W x H x D)
HC	
M958-2141-319	289 x 594 x 22
M958-2291-863	594 x 594 x 22
M958-2152-319	289 x 594 x 46
M958-2292-863	594 x 594 x 46
M8	
M958-8141-319	289 x 594 x 22
M958-8291-863	594 x 594 x 22
M958-8152-319	289 x 594 x 46
M958-8292-863	594 x 594 x 46

**Customized versions available, please contact our sales representatives for more information.*
***AmAir media is also available upon request.*

Bag Filters

DriPak 25

Product Overview

- Patented pocket design
- Sturdy construction
- Synthetic media maximises filtration
- Low initial resistance
- High dust holding capacity

Specification

EN779	G4
ASHRAE 52.2	MERV 7
ISO 16890	Coarse 60%
Filter Depth (mm)	305 - 610
Media Type	Synthetic
Frame Material	Galvanised Steel
Special Size Available	Yes
Antimicrobial Available	Optional
Single Header	Yes
Recommended Final Resistance	375 Pa
Max Operating Temperature	66°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
305 mm					
M261-123-212	12 x 24 x 12	289 x 594 x 305	3	1,700	50
M261-116-212	24 x 24 x 12	594 x 594 x 305	6	3,400	
M261-124-212	12 x 24 x 12	289 x 594 x 305	4	1,700	40
M261-118-212	24 x 24 x 12	594 x 594 x 305	8	3,400	
381 mm					
M261-123-215	12 x 24 x 15	289 x 594 x 381	3	1,700	45
M261-116-215	24 x 24 x 15	594 x 594 x 381	6	3,400	
M261-124-215	12 x 24 x 15	289 x 594 x 381	4	1,700	35
M261-118-215	24 x 24 x 15	594 x 594 x 381	8	3,400	
533 mm					
M261-123-221	12 x 24 x 21	289 x 594 x 533	3	1,700	40
M261-116-221	24 x 24 x 21	594 x 594 x 533	6	3,400	
M261-124-221	12 x 24 x 21	289 x 594 x 533	4	1,700	30
M261-118-221	24 x 24 x 21	594 x 594 x 533	8	3,400	
610 mm					
M261-123-224	12 x 24 x 24	289 x 594 x 610	3	1,700	35
M261-116-224	24 x 24 x 24	594 x 594 x 610	6	3,400	
M261-124-224	12 x 24 x 24	289 x 594 x 610	4	1,700	25
M261-118-224	24 x 24 x 24	594 x 594 x 610	8	3,400	

DriPak 2000

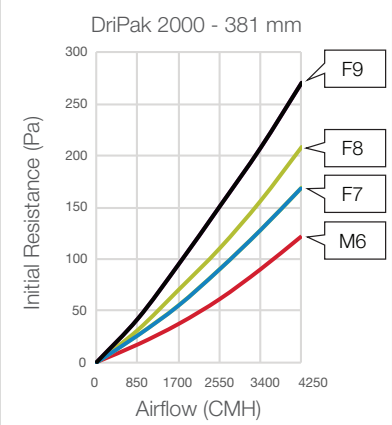
Product Overview

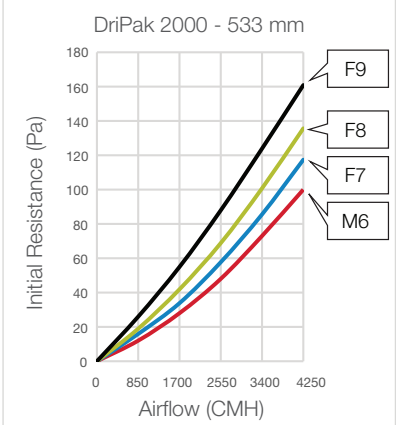
- High-loft layered melt blown synthetic media, stronger than fibreglass
- Non-shedding and water-resistant media
- Ultrasonically-welded pocket configuration that guarantees complete pocket inflation and eliminates crowding or leakage
- Strong and robust material that displays excellent abrasional resistance and performs well in 100% RH condition

Specification

EN779	M5 - F9
ASHRAE 52.2	MERV 10 - 15
ISO 16890	ePM10 70% - 85%
Filter Depth (mm)	305 - 914
Media Type	Synthetic
Frame Material	Galvanised Steel
Special Size Available	Yes
Antimicrobial Available	Optional
Single Header	Yes
Recommended Final Resistance	450 Pa
Max Operating Temperature	66°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow





Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M5 / MERV 10					
M704-123-120	12 x 24 x 12	289 x 594 x 305	3	1,700	97
M704-135-120	20 x 24 x 12	492 x 594 x 305	5	2,800	
M704-116-120	24x 24 x 12	594 x 594 x 305	6	3,400	
M704-123-150	12 x 24 x 15	289 x 594 x 381	3	1,700	84
M704-135-150	20 x 24 x 15	492 x 594 x 381	5	2,800	
M704-116-150	24 x 24 x 15	594 x 594 x 381	6	3,400	
M704-124-210	12 x 24 x 21	289 x 594 x 533	4	1,700	68
M704-136-210	20 x 24 x 21	492 x 594 x 533	6	2,800	
M704-118-210	24 x 24 x 21	594 x 594 x 533	8	3,400	
M704-124-240	12 x 24 x 24	289 x 594 x 610	4	1,700	53
M704-136-240	20 x 24 x 24	492 x 594 x 610	6	2,800	
M704-118-240	24 x 24 x 24	594 x 594 x 610	8	3,400	

DriPak 2000

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%					
M706-123-100	12 x 24 x 10	289 x 594 x 254	3	1,700	123
M706-135-100	20 x 24 x 10	492 x 594 x 254	5	2,800	
M706-116-100	24 x 24 x 10	594 x 594 x 254	6	3,400	
M706-123-120	12 x 24 x 12	289 x 594 x 305	3	1,700	104
M706-135-120	20 x 24 x 12	492 x 594 x 305	5	2,800	
M706-116-120	24 x 24 x 12	594 x 594 x 305	6	3,400	
M706-123-150	12 x 24 x 15	289 x 594 x 381	3	1,700	90
M706-135-150	20 x 24 x 15	492 x 594 x 381	5	2,800	
M706-116-150	24 x 24 x 15	594 x 594 x 381	6	3,400	
M706-124-210	12 x 24 x 21	289 x 594 x 533	4	1,700	73
M706-136-210	20 x 24 x 21	492 x 594 x 533	6	2,800	
M706-118-210	24 x 24 x 21	594 x 594 x 533	8	3,400	
M706-124-240	12 x 24 x 24	289 x 594 x 610	4	1,700	55
M706-136-240	20 x 24 x 24	492 x 594 x 610	6	2,800	
M706-118-240	24 x 24 x 24	594 x 594 x 610	8	3,400	
F7 / MERV 13 / ePM10 80%					
M708-123-100	12 x 24 x 10	289 x 594 x 254	3	1,700	182
M708-135-100	20 x 24 x 10	492 x 594 x 254	5	2,800	
M708-116-100	24 x 24 x 10	594 x 594 x 254	6	3,400	
M708-123-120	12 x 24 x 12	289 x 594 x 305	3	1,700	148
M708-135-120	20 x 24 x 12	492 x 594 x 305	5	2,800	
M708-116-120	24 x 24 x 12	594 x 594 x 305	6	3,400	
M708-123-150	12 x 24 x 15	289 x 594 x 381	3	1,700	128
M708-135-150	20 x 24 x 15	492 x 594 x 381	5	2,800	
M708-116-150	24 x 24 x 15	594 x 594 x 381	6	3,400	
M708-124-210	12 x 24 x 21	289 x 594 x 533	4	1,700	86
M708-136-210	20 x 24 x 21	492 x 594 x 533	6	2,800	
M708-118-210	24 x 24 x 21	594 x 594 x 533	8	3,400	
M708-124-240	12 x 24 x 24	289 x 594 x 610	4	1,700	73
M708-136-240	20 x 24 x 24	492 x 594 x 610	6	2,800	
M708-118-240	24 x 24 x 24	594 x 594 x 610	8	3,400	

DriPak 2000

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F8 / MERV 14 / ePM10 85%					
M709-123-100	12 x 24 x 10	289 x 594 x 254	3	1,700	247
M709-135-100	20 x 24 x 10	492 x 594 x 254	5	2,800	
M709-116-100	24 x 24 x 10	594 x 594 x 254	6	3,400	
M709-123-120	12 x 24 x 12	289 x 594 x 305	3	1,700	213
M709-135-120	20 x 24 x 12	492 x 594 x 305	5	2,800	
M709-116-120	24 x 24 x 12	594 x 594 x 305	6	3,400	
M709-123-150	12 x 24 x 15	289 x 594 x 381	3	1,700	156
M709-135-150	20 x 24 x 15	492 x 594 x 381	5	2,800	
M709-116-150	24 x 24 x 15	594 x 594 x 381	6	3,400	
M709-124-210	12 x 24 x 21	289 x 594 x 533	4	1,700	101
M709-136-210	20 x 24 x 21	492 x 594 x 533	6	2,800	
M709-118-210	24 x 24 x 21	594 x 594 x 533	8	3,400	
M709-124-240	12 x 24 x 24	289 x 594 x 610	4	1,700	84
M709-136-240	20 x 24 x 24	492 x 594 x 610	6	2,800	
M709-118-240	24 x 24 x 24	594 x 594 x 610	8	3,400	
F9 / MERV 15 / ePM10 85%					
M700-123-150	12 x 24 x 15	289 x 594 x 381	3	1,700	208
M700-135-150	20 x 24 x 15	492 x 594 x 381	5	2,800	
M700-116-150	24 x 24 x 15	594 x 594 x 381	6	3,400	
M700-124-210	12 x 24 x 21	289 x 594 x 533	4	1,700	124
M700-136-210	20 x 24 x 21	492 x 594 x 533	6	2,800	
M700-118-210	24 x 24 x 21	594 x 594 x 533	8	3,400	
M700-124-240	12 x 24 x 24	289 x 594 x 610	4	1,700	111
M700-136-240	20 x 24 x 24	492 x 594 x 610	6	2,800	
M700-118-240	24 x 24 x 24	594 x 594 x 610	8	3,400	

DriPak III

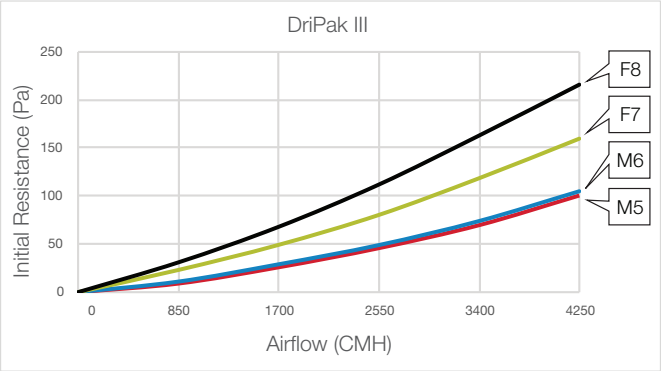
Product Overview

- Micro-fine glass fiber media
- Low resistance and high dust holding capacity
- Engineered for performance reliability
- Stable and reliable filtration performance
- Ideal choice for pre-filtration and end-of-line filtration

Specification

EN779	M5 - F8
ASHRAE 52.2	MERV 10, 11, 13, 14
ISO 16890	ePM10 60%, ePM2.5 50% ePM1 65%, ePM1 80%
Filter Depth (mm)	533, 610
Media Type	Fibreglass
Frame Material	Galvanised Steel
Special Size Available	Yes
Anitmicrobial Available	Optional
Single Header	Yes
Recommended Final Resistance	450 Pa
Max Operating Temperature	66°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M5 / MERV 10 / ePM10 60%					
M260-204-421	12 x 24 x 21	289 x 594 x 533	4	1,700	70
M260-306-421	20 x 24 x 21	492 x 594 x 533	6	2,800	
M260-108-421	24 x 24 x 21	594 x 594 x 533	8	3,400	
M6 / MERV 11 / ePM2.5 50%					
M260-204-621	12 x 24 x 21	289 x 594 x 533	4	1,700	74
M260-306-621	20 x 24 x 21	492 x 594 x 533	6	2,800	
M260-108-621	24 x 24 x 21	594 x 594 x 533	8	3,400	
F7 / MERV 13 / ePM1 65%					
M260-204-821	12 x 24 x 21	289 x 594 x 533	4	1,700	118
M260-306-821	20 x 24 x 21	492 x 594 x 533	6	2,800	
M260-108-821	24 x 24 x 21	594 x 594 x 533	8	3,400	
F8 / MERV 14 / ePM1 80%					
M260-204-921	12 x 24 x 21	289 x 594 x 533	4	1,700	163
M260-306-921	20 x 24 x 21	492 x 594 x 533	6	2,800	
M260-108-921	24 x 24 x 21	594 x 594 x 533	8	3,400	

DriPak NXM

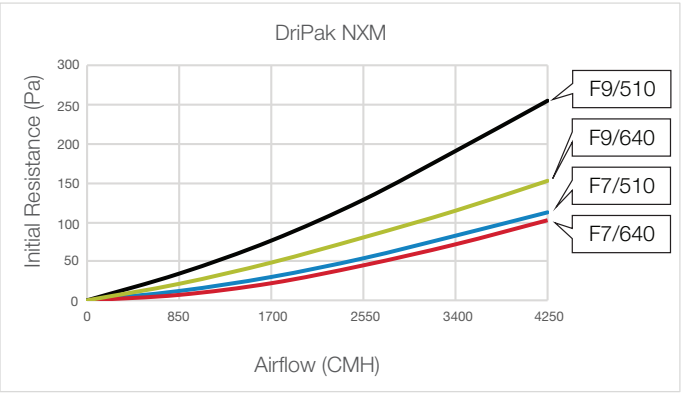
Product Overview

- AAF design - stable tapered pockets for optimum airflow
- Exceptionally low pressure drop for extremely low energy use
- High efficient synthetic media
- Lightweight

Specification

EN779	F7, F9
ASHRAE 52.2	MERV 13, 15
ISO 16890	ePM2.5 55%, ePM1 85%
Filter Depth (mm)	510, 640
Media Type	Synthetic
Frame Material	Galvanised Steel
Special Size Available	Yes
Anitmicrobial Available	Optional
Single Header	Yes
Recommended Final Resistance	450 Pa
Max Operating Temperature	66°C

Initial Resistance vs. Airflow



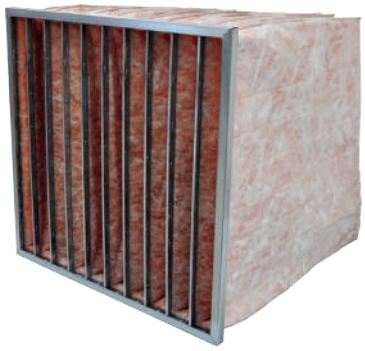
Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F7 / MERV 13 / ePM2.5 55%					
M728-124-200	12 x 24 x 20	289 x 594 x 510	4	1,700	83
M728-136-200	20 x 24 x 20	492 x 594 x 510	6	2,800	
M728-118-200	24 x 24 x 20	594 x 594 x 510	8	3,400	
M728-125-250	12 x 24 x 25	289 x 594 x 640	5	1,700	72
M728-138-250	20 x 24 x 25	492 x 594 x 640	8	2,800	
M728-110-250	24 x 24 x 25	594 x 594 x 640	10	3,400	
F9 / MERV 15 / ePM1 85%					
M720-124-200	12 x 24 x 20	289 x 594 x 510	4	1,700	190
M720-136-200	20 x 24 x 20	492 x 594 x 510	6	2,800	
M720-118-200	24 x 24 x 20	594 x 594 x 510	8	3,400	
M720-125-250	12 x 24 x 25	289 x 594 x 640	5	1,700	114
M720-138-250	20 x 24 x 25	492 x 594 x 640	8	2,800	
M720-110-250	24 x 24 x 25	594 x 594 x 640	10	3,400	

DriPak GXM

Product Overview

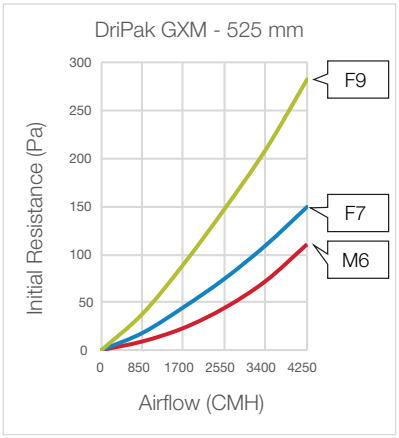
- Innovative design - double tapered pockets for optimum airflow
- Very low resistance and energy use
- Improved dust distribution for increased DHC
- Lightweight

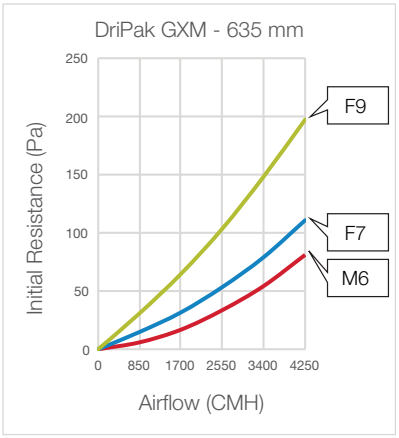


Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM 2.5 50%, ePM1 65%, 85%
Filter Depth (mm)	525, 635
Media Type	Fibreglass
Frame Material	Galvanised Steel
Special Size Available	Yes
Anitmicrobial Available	Optional
Single Header	Yes
Recommended Final Resistance	450 Pa
Max Operating Temperature	66°C

Initial Resistance vs. Airflow





Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Number of Pocket	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM 2.5 50%					
M266-124-200	12 x 24 x 20	289 x 594 x 525	4	1,700	72
M266-136-200	20 x 24 x 20	492 x 594 x 525	6	2,800	
M266-118-200	24 x 24 x 20	594 x 594 x 525	8	3,400	
M266-125-250	12 x 24 x 25	289 x 594 x 635	5	1,700	55
M266-138-250	20 x 24 x 25	492 x 594 x 635	8	2,800	
M266-110-250	24 x 24 x 25	594 x 594 x 635	10	3,400	
F7 / MERV 13 / ePM1 65%					
M267-124-200	12 x 24 x 20	289 x 594 x 525	4	1,700	110
M267-136-200	20 x 24 x 20	492 x 594 x 525	6	2,800	
M267-118-200	24 x 24 x 20	594 x 594 x 525	8	3,400	
M267-125-250	12 x 24 x 25	289 x 594 x 635	5	1,700	80
M267-138-250	20 x 24 x 25	492 x 594 x 635	8	2,800	
M267-110-250	24 x 24 x 25	594 x 594 x 635	10	3,400	
F9 / MERV 15 / ePM1 85%					
M269-124-200	12 x 24 x 20	289 x 594 x 525	4	1,700	210
M269-136-200	20 x 24 x 20	492 x 594 x 525	6	2,800	
M269-118-200	24 x 24 x 20	594 x 594 x 525	8	3,400	
M269-125-250	12 x 24 x 25	289 x 594 x 635	5	1,700	149
M269-138-250	20 x 24 x 25	492 x 594 x 635	8	2,800	
M269-110-250	24 x 24 x 25	594 x 594 x 635	10	3,400	

Compact Filters

RigiFil / VariCel RF

Product Overview

- Designed for improved performance and durability
- Layered synthetic media with plastic pleat spacers on both sides
- Heavy-duty expanded metal media support grid
- Ideal for Variable Air Volume (VAV) systems

Specification

EN779	M6 - F8
ASHRAE 52.2	MERV 11 - 14
Filter Depth (mm)	149, 292
Media Type	Synthetic
Frame Material	Galvanised Steel, Plastic (None Header)
Special Size Available	Yes
Antimicrobial Available	Optional
Header Type (Standard)	Single, None Header (GI), None (Plastic)
Header Type (Optional)	Double
Recommended Final Resistance	450 Pa
Max Operating Temperature	93°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11					
M337-160-319	12 x 24 x 12	289 x 594 x 292	Single	1,700	63
M337-160-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-060-319	12 x 24 x 12	289 x 594 x 292	None (GI)	1,700	50
M337-060-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-760-319N	12 x 24 x 12	289 x 594 x 292	None (Plastic)	1,700	
M337-760-863N	24 x 24 x 12	594 x 594 x 292		3,400	
F7 / MERV 13					
M337-180-319	12 x 24 x 12	289 x 594 x 292	Single	1,700	90
M337-180-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-080-319	12 x 24 x 12	289 x 594 x 292	None (GI)	1,700	74
M337-080-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-780-319N	12 x 24 x 12	289 x 594 x 292	None (Plastic)	1,700	
M337-780-863N	24 x 24 x 12	594 x 594 x 292		3,400	
F8 / MERV 14					
M337-190-319	12 x 24 x 12	289 x 594 x 292	Single	1,700	140
M337-190-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-090-319	12 x 24 x 12	289 x 594 x 292	None (GI)	1,700	103
M337-090-863	24 x 24 x 12	594 x 594 x 292		3,400	
M337-790-319N	12 x 24 x 12	289 x 594 x 292	None (Plastic)	1,700	
M337-790-863N	24 x 24 x 12	594 x 594 x 292		3,400	

**Other filter classifications are available upon request.*

VariCel I

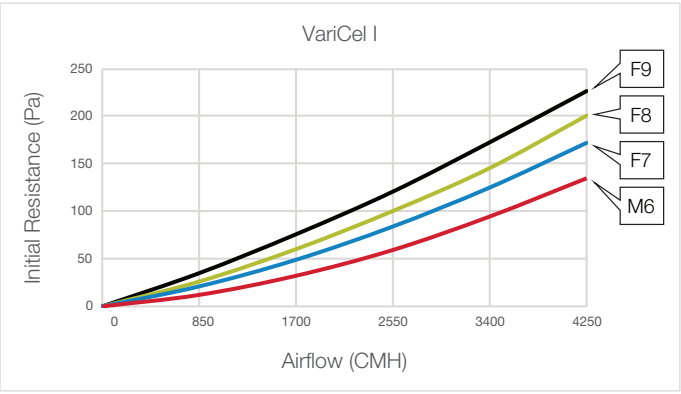
Product Overview

- Excellent performance in difficult operating conditions
- Dual density media delivers longer life and the lowest initial resistance
- Designed to improve Indoor Air Quality
- Water-resistant media ideal for installations in humid areas, or where exposed to moisture
- MERV 13 meet LEED® Project Certification efficiency requirements

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM10 70%, ePM1 55% - 80%
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Particle Board, MDF, Plywood
Separator Style	Aluminium
Special Size Available	Yes
Antimicrobial Available	Optional
Header Type	Single, Double, None Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	120°C (SH & DH), 93°C (NH)
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%					
M331-953-455	16 x 20 x 6	390 x 492 x 149	Single	950	40
M331-953-435	20 x 20 x 6	492 x 492 x 149		1,180	
M331-953-449	12 x 24 x 6	289 x 594 x 149		850	
M331-953-488	20 x 24 x 6	492 x 594 x 149		1,420	
M331-953-447	24 x 24 x 6	594 x 594 x 149		1,700	
M331-953-484	16 x 25 x 6	390 x 619 x 149		1,180	
M331-109-440	12 x 24 x 6	289 x 594 x 149	Double	850	
M331-109-406	20 x 24 x 6	492 x 594 x 149		1,420	
M331-109-416	24 x 24 x 6	594 x 594 x 149		1,700	
M331-009-549	12 x 24 x 6	289 x 594 x 149	None	850	35
M331-009-588	20 x 24 x 6	492 x 594 x 149		1,420	
M331-009-547	24 x 24 x 6	594 x 594 x 149		1,700	
M331-953-456	16 x 20 x 12	390 x 492 x 292	Single	1,890	94
M331-953-436	20 x 20 x 12	492 x 492 x 292		2,360	
M331-953-450	12 x 24 x 12	289 x 594 x 292		1,700	
M331-953-489	20 x 24 x 12	492 x 594 x 292		2,830	
M331-953-448	24 x 24 x 12	594 x 594 x 292		3,400	
M331-953-485	16 x 25 x 12	390 x 619 x 292		2,360	
M331-109-402	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M331-109-403	20 x 24 x 12	492 x 594 x 292		2,830	
M331-109-401	24 x 24 x 12	594 x 594 x 292		3,400	
M331-009-550	12 x 24 x 12	289 x 594 x 292	None	1,700	80
M331-009-589	20 x 24 x 12	492 x 594 x 292		2,830	
M331-009-548	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel I

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F7 / MERV 13 / ePM1 55%					
M331-765-455	16 x 20 x 6	390 x 492 x 149	Single	950	75
M331-765-435	20 x 20 x 6	490 x 492 x 149		1,180	
M331-765-449	12 x 24 x 6	289 x 594 x 149		850	
M331-765-488	20 x 24 x 6	492 x 594 x 149		1,420	
M331-765-447	24 x 24 x 6	594 x 594 x 149		1,700	
M331-765-484	16 x 25 x 6	390 x 619 x 149		1,180	
M331-091-440	12 x 24 x 6	289 x 594 x 149	Double	850	
M331-091-406	20 x 24 x 6	492 x 594 x 149		1,420	
M331-091-416	24 x 24 x 6	594 x 594 x 149		1,700	
M331-017-549	12 x 24 x 6	289 x 594 x 149	None	850	60
M331-017-588	20 x 24 x 6	492 x 594 x 149		1,420	
M331-017-547	24 x 24 x 6	594 x 594 x 149		1,700	
M331-765-456	16 x 20 x 12	390 x 492 x 292	Single	1,890	125
M331-765-436	20 x 20 x 12	492 x 492 x 292		2,360	
M331-765-450	12 x 24 x 12	289 x 594 x 292		1,700	
M331-765-489	20 x 24 x 12	492 x 594 x 292		2,830	
M331-765-448	24 x 24 x 12	594 x 594 x 292		3,400	
M331-765-485	16 x 25 x 12	390 x 619 x 292		2,360	
M331-091-402	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M331-091-403	20 x 24 x 12	492 x 594 x 292		2,830	
M331-091-401	24 x 24 x 12	594 x 594 x 292		3,400	
M331-017-550	12 x 24 x 12	289 x 594 x 292	None	1,700	115
M331-017-589	20 x 24 x 12	492 x 594 x 292		2,830	
M331-017-548	24 x 24 x 12	594 x 594 x 292		3,400	
F8 / MERV 14 / ePM1 70%					
M331-946-455	16 x 20 x 6	390 x 492 x 149	Single	950	95
M331-946-435	20 x 20 x 6	492 x 492 x 149		1,180	
M331-946-449	12 x 24 x 6	289 x 594 x 149		850	
M331-946-488	20 x 24 x 6	492 x 594 x 149		1,420	
M331-946-447	24 x 24 x 6	594 x 594 x 149		1,700	
M331-946-484	16 x 25 x 6	390 x 619 x 149		1,180	
M331-300-440	12 x 24 x 6	289 x 594 x 149	Double	850	
M331-300-406	20 x 24 x 6	492 x 594 x 149		1,420	
M331-300-416	24 x 24 x 6	594 x 594 x 149		1,700	
M331-025-549	12 x 24 x 6	289 x 594 x 149	None	850	75
M331-025-588	20 x 24 x 6	492 x 594 x 149		1,420	
M331-025-547	24 x 24 x 6	594 x 594 x 149		1,700	
M331-946-456	16 x 20 x 12	390 x 492 x 292	Single	1,890	145
M331-946-436	20 x 20 x 12	492 x 492 x 292		2,360	
M331-946-450	12 x 24 x 12	289 x 594 x 292		1,700	
M331-946-489	20 x 24 x 12	492 x 594 x 292		2,830	
M331-946-448	24 x 24 x 12	594 x 594 x 292		3,400	
M331-946-485	16 x 25 x 12	390 x 619 x 292		2,360	
M331-300-402	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M331-300-403	20 x 24 x 12	492 x 594 x 292		2,830	
M331-300-401	24 x 24 x 12	594 x 594 x 292		3,400	
M331-025-550	12 x 24 x 12	289 x 594 x 292	None	1,700	120
M331-025-589	20 x 24 x 12	492 x 594 x 292		2,830	
M331-025-548	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel I

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F9 / MERV 15 / ePM1 80%					
M331-948-455	16 x 20 x 6	390 x 492 x 149	Single	950	135
M331-948-435	20 x 20 x 6	492 x 492 x 149		1,180	
M331-948-449	12 x 24 x 6	289 x 594 x 149		850	
M331-948-488	20 x 24 x 6	492 x 594 x 149		1,420	
M331-948-447	24 x 24 x 6	594 x 594 x 149		1,180	
M331-948-484	16 x 25 x 6	390 x 619 x 149		1,150	
M331-949-440	12 x 24 x 6	289 x 594 x 149	Double	850	
M331-949-406	20 x 24 x 6	492 x 594 x 149		1,420	
M331-949-416	24 x 24 x 6	594 x 594 x 149		1,700	
M331-947-549	12 x 24 x 6	289 x 594 x 149	None	850	115
M331-947-588	20 x 24 x 6	492 x 594 x 149		1,420	
M331-947-547	24 x 24 x 6	594 x 594 x 149		1,700	
M331-948-456	16 x 20 x 12	390 x 492 x 292	Single	1,890	173
M331-948-436	20 x 20 x 12	492 x 492 x 292		2,360	
M331-948-450	12 x 24 x 12	289 x 594 x 292		1,700	
M331-948-489	20 x 24 x 12	492 x 594 x 292		2,830	
M331-948-448	24 x 24 x 12	594 x 594 x 292		3,400	
M331-948-485	16 x 25 x 12	390 x 619 x 292		2,360	
M331-949-402	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M331-949-403	20 x 24 x 12	492 x 594 x 292		2,830	
M331-949-401	24 x 24 x 12	594 x 594 x 292		3,400	
M331-947-550	12 x 24 x 12	289 x 594 x 292	None	1,700	155
M331-947-589	20 x 24 x 12	492 x 594 x 292		2,830	
M331-947-548	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel M-Pak

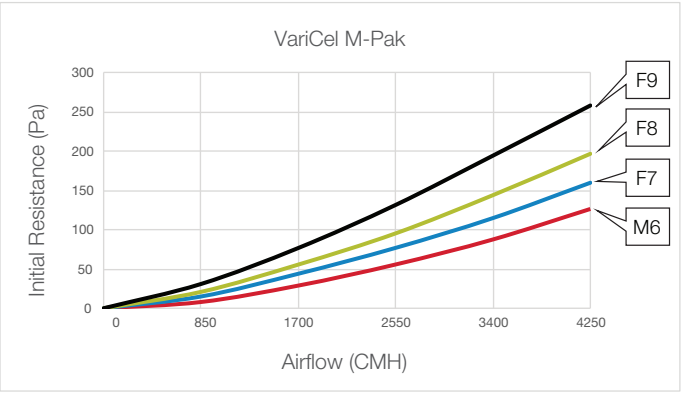
Product Overview

- Delivers comparable efficiency, pressure drop, and overall performance in half the footprint with a Mini media pack design
- 149 mm - deep filter with the same media area as 292 mm filter
- Space-saving design - reduces storage and handling cost
- Sturdy high impact polystyrene cell sides enclose a fixed media pack
- Fully incinerable
- MERV 13 and higher meet LEED® Project Certification efficiency requirements

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM10 70%, ePM1 55% - 80%
Filter Depth (mm)	149
Media Type	Fibreglass
Frame Material	Plastic
Separator Style	Hot Melt
Special Size Available	No
Antimicrobial Available	Optional
Header Type	Single Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	70°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%				
M335-163-701N	12 x 24 x 6	287 x 592 x 149	1,700	88
M335-163-708N	24 x 24 x 6	592 x 592 x 149	3,400	
F7 / MERV 13 / ePM1 55%				
M335-183-701N	12 x 24 x 6	287 x 592 x 149	1,700	115
M335-183-708N	24 x 24 x 6	592 x 592 x 149	3,400	
F8 / MERV 14 / ePM1 70%				
M335-193-701N	12 x 24 x 6	287 x 592 x 149	1,700	145
M335-193-708N	24 x 24 x 6	592 x 592 x 149	3,400	
F9 / MERV 15 / ePM1 80%				
M335-103-701N	12 x 24 x 6	287 x 592 x 149	1,700	195
M335-103-708N	24 x 24 x 6	592 x 592 x 149	3,400	

VariCel II

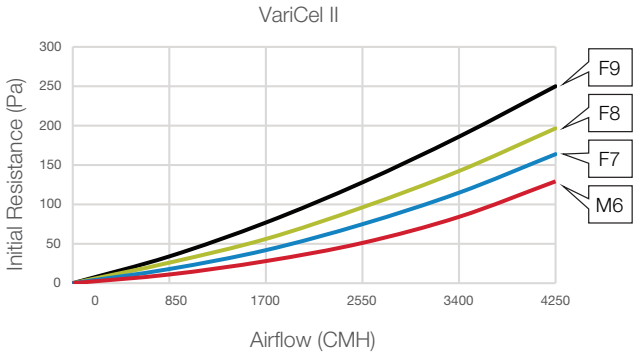
Product Overview

- True high-efficiency filter
- Slim-line, mini-pleat design reduces operating costs
- Engineered for a variety of applications
- Easy disposal
- Available with antimicrobial

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM10 70%, ePM1 55% - 80%
Filter Depth (mm)	95
Media Type	Fibreglass
Frame Material	Moisture Resistant Beverage Board
Separator Style	Hot Melt
Special Size Available	Yes
Antimicrobial Available	Optional
Header Type	None Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	70°C
Air Filtration Certificate	UL 900

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%				
M332-402-005	20 x 20 x 4	492 x 492 x 95	2,360	84
M332-402-001	12 x 24 x 4	289 x 594 x 95	1,700	
M332-402-006	20 x 24 x 4	492 x 594 x 95	2,840	
M332-402-008	24 x 24 x 4	594 x 594 x 95	3,400	
F7 / MERV 13 / ePM1 55%				
M332-410-005	20 x 20 x 4	492 x 492 x 95	2,360	115
M332-410-001	12 x 24 x 4	289 x 594 x 95	1,700	
M332-410-006	20 x 24 x 4	492 x 594 x 95	2,840	
M332-410-008	24 x 24 x 4	594 x 594 x 95	3,400	
F8 / MERV 14 / ePM1 70%				
M332-428-005	20 x 20 x 4	492 x 492 x 95	2,360	142
M332-428-001	12 x 24 x 4	289 x 594 x 95	1,700	
M332-428-006	20 x 24 x 4	492 x 594 x 95	2,840	
M332-428-008	24 x 24 x 4	594 x 594 x 95	3,400	
F9 / MERV 15 / ePM1 80%				
M332-430-005	20 x 20 x 4	492 x 492 x 95	2,360	186
M332-430-001	12 x 24 x 4	289 x 594 x 95	1,700	
M332-430-006	20 x 24 x 4	492 x 594 x 95	2,840	
M332-430-008	24 x 24 x 4	594 x 594 x 95	3,400	

VariCel II M/MH

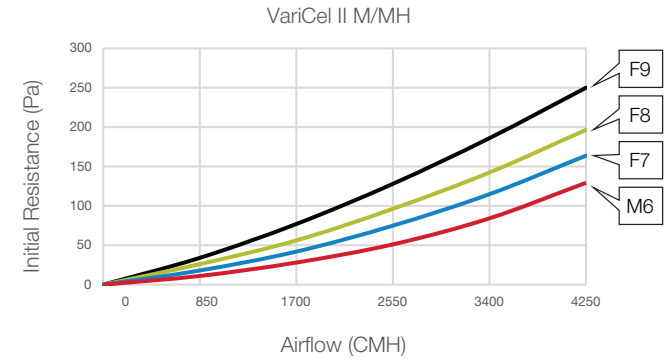
Product Overview

- True high-efficiency filter
- Slim-line, mini-pleat design lowers operating costs
- Engineered for a variety of applications
- Metal construction
- Water repellent

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM10 70%, ePM1 55% - 80%
Filter Depth (mm)	95, 104
Media Type	Fibreglass
Frame Material	Galvanised Steel
Separator Style	Hot Melt
Special Size Available	Yes
Antimicrobial Available	Optional
Header Type	None, Single Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	70°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%					
M332-406-001	12 x 24 x 4	289 x 594 x 95	None (M)	1,700	84
M332-406-006	20 x 24 x 4	492 x 594 x 95		2,830	
M332-406-008	24 x 24 x 4	594 x 594 x 95		3,400	
M332-404-001	12 x 24 x 4	289 x 594 x 104	Single (MH)	1,700	108
M332-404-006	20 x 24 x 4	492 x 594 x 104		2,830	
M332-404-008	24 x 24 x 4	594 x 594 x 104		3,400	
F7 / MERV 13 / ePM1 55%					
M332-416-001	12 x 24 x 4	289 x 594 x 95	None (M)	1,700	115
M332-416-006	20 x 24 x 4	492 x 594 x 95		2,830	
M332-416-008	24 x 24 x 4	594 x 594 x 95		3,400	
M332-414-001	12 x 24 x 4	289 x 594 x 104	Single (MH)	1,700	143
M332-414-006	20 x 24 x 4	492 x 594 x 104		2,830	
M332-414-008	24 x 24 x 4	594 x 594 x 104		3,400	
F8 / MERV 14 / ePM1 70%					
M332-436-001	12 x 24 x 4	289 x 594 x 95	None (M)	1,700	142
M332-436-006	20 x 24 x 4	492 x 594 x 95		2,830	
M332-436-008	24 x 24 x 4	594 x 594 x 95		3,400	
M332-434-001	12 x 24 x 4	289 x 594 x 104	Single (MH)	1,700	180
M332-434-006	20 x 24 x 4	492 x 594 x 104		2,830	
M332-434-008	24 x 24 x 4	594 x 594 x 104		3,400	
F9 / MERV 15 / ePM1 80%					
M332-446-001	12 x 24 x 4	289 x 594 x 95	None (M)	1,700	186
M332-446-006	20 x 24 x 4	492 x 594 x 95		2,830	
M332-446-008	24 x 24 x 4	594 x 594 x 95		3,400	
M332-444-001	12 x 24 x 4	289 x 594 x 104	Single (MH)	1,700	210
M332-444-006	20 x 24 x 4	492 x 594 x 104		2,830	
M332-444-008	24 x 24 x 4	594 x 594 x 104		3,400	

VariCel VXL

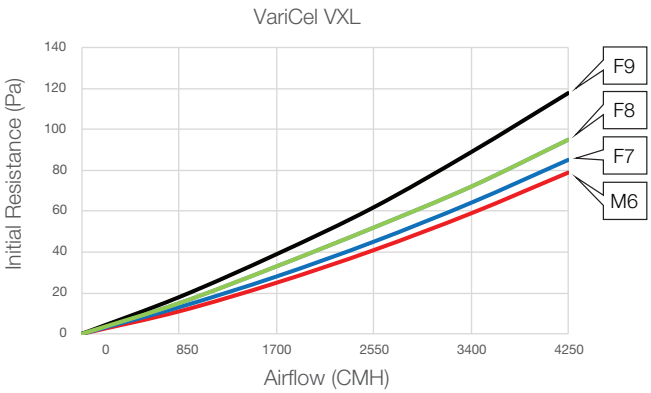
Product Overview

- Design with a built-in spacer allows the pleated prefilter to get the most out of its media
- Lowest initial resistance with the new design
- Alleviate turbulence airflow and ensure the fine fibre maintains its efficiency
- Minimizing the operating costs
- Excellent performance under extreme operating conditions
- Lightweight and easy to install
- Filter with the longest lifespan and highest efficiency

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
ISO 16890	ePM10 70%, ePM1 55% - 80%
Filter Depth (mm)	304
Media Type	Fibreglass
Frame Material	Plastic
Separator Style	Hot Melt
Special Size Available	No
Antimicrobial Available	Optional
Header Type	Single Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	70°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11 / ePM10 70%				
M336-031-003N	24 x 12 x 12	592 x 287 x 304	1,700	59
M336-031-002N	24 x 20 x 12	592 x 490 x 304	2,830	
M336-031-001N	24 x 24 x 12	592 x 592 x 304	3,400	
F7 / MERV 13 / ePM1 55%				
M336-016-003N	24 x 12 x 12	592 x 287 x 304	1,700	64
M336-016-002N	24 x 20 x 12	592 x 490 x 304	2,830	
M336-016-001N	24 x 24 x 12	592 x 592 x 304	3,400	
F8 / MERV 14 / ePM1 70%				
M336-013-003N	24 x 12 x 12	592 x 287 x 304	1,700	72
M336-013-002N	24 x 20 x 12	592 x 490 x 304	2,830	
M336-013-001N	24 x 24 x 12	592 x 592 x 304	3,400	
F9 / MERV 15 / ePM1 80%				
M336-010-003N	24 x 12 x 12	592 x 287 x 304	1,700	89
M336-010-002N	24 x 20 x 12	592 x 490 x 304	2,830	
M336-010-001N	24 x 24 x 12	592 x 592 x 304	3,400	

ULPA, HEPA & EPA Filters

BioCell

Product Overview

- Rigid all-metal construction and water-resistant media in a supported pleat-type configuration
- Can be used in systems with difficult operating conditions, including:
  - Variable air volume
  - Turbulent airflow
  - Repeated fan shutdown
  - High temperature
  - High humidity
  - Intermittent exposure to water, such as sea coast installations

Specification

EN1822	E10, E11
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material	Galvanised Steel
Separator Style	Aluminium
Special Size Available	Yes
Antimicrobial Available	No
Header Type (Standard)	Single Header
Header Type (Optional)	Double Header
Gasket Material (Standard)	None
Gasket Material (Optional)	Neoprene, PU
Recommended Final Resistance	500 Pa
Max Operating Temperature	90°C
Air Filtration Certificate	UL 900

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
E10				
M510-532-415	12 x 24 x 6	289 x 594 x 149	850	250
M510-532-425	20 x 24 x 6	492 x 594 x 149	1,400	
M510-532-413	24 x 24 x 6	594 x 594 x 149	1,700	
M510-532-416	12 x 24 x 12	289 x 594 x 292	1,700	
M510-532-423	20 x 24 x 12	492 x 594 x 292	2,800	
M510-532-414	24 x 24 x 12	594 x 594 x 292	3,400	
E11				
M610-532-415	12 x 24 x 6	289 x 594 x 149	750	250
M610-532-425	20 x 24 x 6	492 x 594 x 149	1,250	
M610-532-413	24 x 24 x 6	594 x 594 x 149	1,500	
M610-532-416	12 x 24 x 12	289 x 594 x 292	1,500	
M610-532-423	20 x 24 x 12	492 x 594 x 292	2,500	
M610-532-414	24 x 24 x 12	594 x 594 x 292	3,000	

BioCel M-Pak

Product Overview

- Space-saving design reduces storage and handling cost
- 149 mm depth filter with the same performance as 292 mm depth filters
- Sturdy high impact polystyrene cell sides enclose a fixed media pack
- Fully incinerable

Specification

EN1822	E10
Filter Depth (mm)	149
Media Type	Fibreglass
Frame Material	Plastic
Separator Style	Hot Melt
Special Size Available	No
Antimicrobial Available	No
Header Type	Single Header
Gasket Material (Standard)	None
Gasket Material (Optional)	Neoprene, PU
Recommended Final Resistance	500 Pa
Max Operating Temperature	70°C
Air Filtration Certificate	UL 900

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
E10				
M315-103- 701	12 x 24 x 6	287 x 592 x 149	1,700	200
M315-103- 708	24 x 24 x 6	592 x 592 x 149	3,400	

BioCel III

Product Overview

- E10 & E11 classification in accordance with EN1822
- 4,000 CMH air capacity
- Low energy consumption
- Long service life

Specification

EN1822	E10, E11
Filter Depth (mm)	292
Media Type	Fibreglass
Frame Material	Galvanised Steel
Separator Style	Hot Melt
Special Size Available	No
Antimicrobial Available	No
Header Type	None Header
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, None
Recommended Final Resistance	500 Pa
Max Operating Temperature	70°C

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
E10			
M473-205-1630	594 x 289 x 292	2,000	170
M473-205-512	594 x 594 x 292	4,000	
M473-205-004	610 x 305 x 292	2,000	160
M473-205-005	610 x 610 x 292	4,000	
E11			
M475-205-1630	594 x 289 x 292	2,000	220
M475-205-512	594 x 594 x 292	4,000	
M475-205-004	610 x 305 x 292	2,000	200
M475-205-005	610 x 610 x 292	4,000	

BioCel VXL

Product Overview

- Engineered to meet the exacting requirements of precision manufacturing operations and laboratories
- Fills the gap between ASHRAE grade high-efficiency filters and high efficiency HEPA filters
- Low initial pressure drop
- High impact polystyrene (HIPS) cell sides
- Fully incinerable

Specification

EN1822	E10, E11
Filter Depth (mm)	304
Media Type	Fibreglass
Frame Material	Plastic
Separator Style	Hot Melt
Special Size Available	No
Antimicrobial Available	No
Header Type	Single Header
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, None
Recommended Final Resistance	500 Pa
Max Operating Temperature	70°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
E10				
M336-124-003N	24 x 12 x 12	592 x 287 x 304	1,700	150
M336-124-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M336-124-001N	24 x 24 x 12	592 x 592 x 304	3,400	
E11				
M336-128-003N	24 x 12 x 12	592 x 287 x 304	1,700	180
M336-128-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M336-128-001N	24 x 24 x 12	592 x 592 x 304	3,400	

AstroCel I

Product Overview

- Individually tested for certified performance
- Available in varieties of cell sides and efficiencies
- Available in gasket and gel seal
- High capacity option for higher airflow

Specification

EN1822	H13, H14
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Aluminium, Stainless Steel Plywood, Particle Board
Separator Style	Aluminum
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, EPDM, PU Gel
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Optional
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	90°C
Air Filtration Certificate	UL 900

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AstroCel® I (H13)			
M566-203-004	610 x 305 x 149	425	250
M566-203-005	610 x 610 x 149	850	
M566-205-004	610 x 305 x 292	850	
M566-205-005	610 x 610 x 292	1,700	
AstroCel® I (H14)			
M563-203-004	610 x 305 x 149	425	250
M563-203-005	610 x 610 x 149	850	
M563-205-004	610 x 305 x 292	850	
M563-205-005	610 x 610 x 292	1,700	
AstroCel® I HC (H13)			
M556-203-004	610 x 305 x 149	850	350
M556-203-005	610 x 610 x 149	1,700	
M556-205-004	610 x 305 x 292	1,700	
M556-205-005	610 x 610 x 292	3,400	
AstroCel® I HC (H14)			
M553-203-004	610 x 305 x 149	850	350
M553-203-005	610 x 610 x 149	1,700	
M553-205-004	610 x 305 x 292	1,700	
M553-205-005	610 x 610 x 292	3,400	

AstroCel I S+

Product Overview

- HEPA grade air filtration media with superior strength and anti-microbial properties
- The filter media performance was tested against bacteria and virus
- Lowest possible pressure drop without compromising antimicrobial properties
- Made of fibreglass media immobilized with antimicrobial agents to combat harmful microorganisms
- New innovation media not only traps small particles, but also minimizes the number of microbes by inhibiting their growth and reproduction

Specification

EN1822	H13, H14
JIS Z 2801*	100%**
ISO 18184*	99.9%**
Filter Depth (mm)	149, 292
Media Type	Fibreglass with antimicrobial properties
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Aluminium, Stainless Steel Plywood, Particle Board
Separator Style	Aluminium
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, EPDM, PU Gel
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	No
Special Size Available	Yes
Antimicrobial Available	Yes
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	90ºC

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AstroCel I S+ (H13)			
MA566-203-004	610 x 305 x 149	425	250
MA566-203-005	610 x 610 x 149	850	
MA566-205-004	610 x 305 x 292	850	
MA566-205-005	610 x 610 x 292	1,700	
AstroCel I S+ (H14)			
MA563-203-004	610 x 305 x 149	425	260
MA563-203-005	610 x 610 x 149	850	
MA563-205-004	610 x 305 x 292	850	
MA563-205-005	610 x 610 x 292	1,700	
AstroCel I S+ HC (H13)			
MA556-203-004	610 x 305 x 149	850	360
MA556-203-005	610 x 610 x 149	1,700	
MA556-205-004	610 x 305 x 292	1,700	
MA556-205-005	610 x 610 x 292	3,400	

**The test on filter media was done in a controlled environment. Actual performance may differ in different conditions and environments.*
***The efficacy shown applies only to the tested specimens: COVID-19 (SARS-CoV-2), Influenza A virus (H1N1), Human Coronavirus 229E, Staphylococcus aureus, and Escherichia coli. All tests were conducted on media that had been exposed to specific viruses and bacteria within a specific regulated time period of 24 hours of contact time, aside from SARS-CoV-2, which had 30 minutes of contact time. Performance against other viruses and bacteria may vary.*

AstroPak

Product Overview

- Individually tested for certified performance
- Hot-melt separator-style glass media pack
- No metal in airstream
- Gasket seal

Specification

EN1822	H13, H14
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Aluminium, Stainless Steel Plywood, Particle Board
Separator Style	Hot Melt
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	No
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	500 Pa
Max Operating Temperature	70°C

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13			
M746-203-004	610 x 305 x 149	650	250
M746-203-005	610 x 610 x 149	1,300	
M646-203-004	610 x 305 x 149	1,000	
M646-203-005	610 x 610 x 149	2,000	
M846-205-004	610 x 305 x 292	1,150	
M846-205-005	610 x 610 x 292	2,300	
H14			
M743-203-004	610 x 305 x 149	475	250
M743-203-005	610 x 610 x 149	950	
M643-203-004	610 x 305 x 149	750	
M643-203-005	610 x 610 x 149	1,500	
M843-205-004	610 x 305 x 292	875	
M843-205-005	610 x 610 x 292	1,750	

AstroCel II (Gasket Seal)

Product Overview

- Individually tested for certified performance
- Reduces operation costs with lowest possible pressure drop from microglass media
- Available in a range of efficiencies
- Lightweight and compact

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	69, 93, 117
Media Type	Fibreglass
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900, FM 4920

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M574-223-005	610 x 610 x 69	603	104
M574-223-008	610 x 1220 x 69	1,206	
M574-223-538	1220 x 1220 x 69	2,411	
M574-323-005	610 x 610 x 93	603	75
M574-323-008	610 x 1220 x 93	1,206	
M574-323-538	1220 x 1220 x 93	2,411	
M574-423-005	610 x 610 x 117	603	65
M574-423-008	610 x 1220 x 117	1,206	
M574-423-538	1220 x 1220 x 117	2,411	
H14 / ISO 45 H			
M575-223-005	610 x 610 x 69	603	130
M575-223-008	610 x 1220 x 69	1,206	
M575-223-538	1220 x 1220 x 69	2,411	
M575-323-005	610 x 610 x 93	603	90
M575-323-008	610 x 1220 x 93	1,206	
M575-323-538	1220 x 1220 x 93	2,411	
M575-423-005	610 x 610 x 117	603	80
M575-423-008	610 x 1220 x 117	1,206	
M575-423-538	1220 x 1220 x 117	2,411	

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
U15 / ISO 55 U			
M577-223-005	610 x 610 x 69	603	140
M577-223-008	610 x 1220 x 69	1,206	
M577-223-538	1220 x 1220 x 69	2,411	
M577-323-005	610 x 610 x 93	603	99
M577-323-008	610 x 1220 x 93	1,206	
M577-323-538	1220 x 1220 x 93	2,411	
M577-423-005	610 x 610 x 117	603	85
M577-423-008	610 x 1220 x 117	1,206	
M577-423-538	1220 x 1220 x 117	2,411	
U16 / ISO 65 U			
M578-223-005	610 x 610 x 69	603	191
M578-223-008	610 x 1220 x 69	1,206	
M578-223-538	1220 x 1220 x 69	2,411	
M578-323-005	610 x 610 x 93	603	123
M578-323-008	610 x 1220 x 93	1,206	
M578-323-538	1220 x 1220 x 93	2,411	
M578-423-005	610 x 610 x 117	603	109
M578-423-008	610 x 1220 x 117	1,206	
M578-423-538	1220 x 1220 x 117	2,411	

**Other filter classifications are available upon request.*

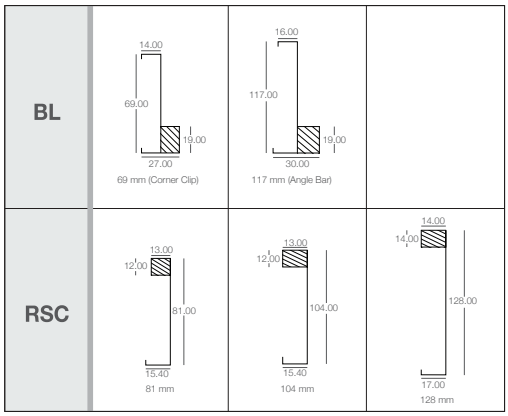
AstroCel II (Gel Seal)

Product Overview

- Individually tested for certified performance
- Reduces operation costs with lowest possible pressure drop from microglass media
- Available in a range of efficiencies
- Lightweight and compact
- Gel seal design

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	Various
Media Type	Fibreglass
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU Gel
Gasket Material (Optional)	Silicone Gel
Gasket Position	Downstream (BL), Upstream (RSC)
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900, FM 4920[1]



Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Gel Position
H13 / ISO 35 H				
M994-203-005	610 x 610 x 69	603	104	BL
M994-203-008	610 x 1220 x 69	1,206		
M964-403-005	610 x 610 x 117	603	65	
M964-403-008	610 x 1220 x 117	1,206		
M504-203-005	610 x 610 x 81	603	104	RSC
M504-203-008	610 x 1220 x 81	1,206		
M504-503-005	610 x 610 x 104	603	75	
M504-503-008	610 x 1220 x 104	1,206		
M504-403-005	610 x 610 x 128	603	65	
M504-403-008	610 x 1220 x 128	1,206		
H14 / ISO 45 H				
M995-203-005	610 x 610 x 69	603	130	BL
M995-203-008	610 x 1220 x 69	1,206		
M965-403-005	610 x 610 x 117	603	80	
M965-403-008	610 x 1220 x 117	1,206		
M505-203-005	610 x 610 x 81	603	130	RSC
M505-203-008	610 x 1220 x 81	1,206		
M505-503-005	610 x 610 x 104	603	90	
M505-503-008	610 x 1220 x 104	1,206		
M505-403-005	610 x 610 x 128	603	80	
M505-403-008	610 x 1220 x 128	1,206		

[1]FM 4920 certificate is only applicable to silicone gel.
**Other filter classifications are available upon request.*

AstroCel II (Gel Seal)

Product Information

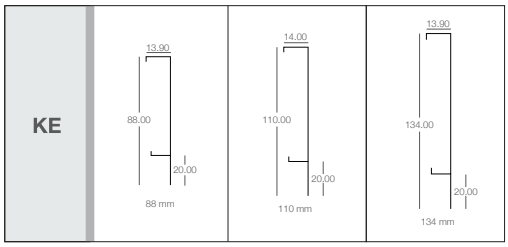
Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Gel Position
U15 / ISO 55 U				
M997-203-005	610 x 610 x 69	603	140	BL
M997-203-008	610 x 1220 x 69	1,206		
M967-403-005	610 x 610 x 117	603	85	
M967-403-008	610 x 1220 x 117	1,206		
M507-203-005	610 x 610 x 81	603	140	RSC
M507-203-008	610 x 1220 x 81	1,206		
M507-503-005	610 x 610 x 104	603	99	
M507-503-008	610 x 1220 x 104	1,206		
M507-403-005	610 x 610 x 128	603	85	
M507-403-008	610 x 1220 x 128	1,206		
U16 / ISO 65 U				
M998-203-005	610 x 610 x 69	603	191	BL
M998-203-008	610 x 1220 x 69	1,206		
M968-403-005	610 x 610 x 117	603	109	
M968-403-008	610 x 1220 x 117	1,206		
M508-203-005	610 x 610 x 81	603	191	RSC
M508-203-008	610 x 1220 x 81	1,206		
M508-503-005	610 x 610 x 104	603	123	
M508-503-008	610 x 1220 x 104	1,206		
M508-403-005	610 x 610 x 128	603	109	
M508-403-008	610 x 1220 x 128	1,206		

**Other filter classifications are available upon request.*

AstroCel II (Knife Edge)

Product Overview

- Individually tested for certified performance
- Reduces operation costs with lowest possible pressure drop from microglass media
- Available in a range of efficiencies
- Lightweight and compact



Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	88, 110, 134
Media Type	Fibreglass
Frame Material	Aluminium
Separator Style	Hot Melt
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900, FM 4920

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M904-223-005	610 x 610 x 88	603	104
M904-223-008	610 x 1220 x 88	1,206	
M984-223-538	1220 x 1220 x 88	2,411	
M904-323-005	610 x 610 x 110	603	75
M904-323-008	610 x 1220 x 110	1,206	
M984-323-538	1220 x 1220 x 110	2,411	
M904-423-005	610 x 610 x 134	603	65
M904-423-008	610 x 1220 x 134	1,206	
M984-423-538	1220 x 1220 x 134	2,411	
H14 / ISO 45 H			
M905-223-005	610 x 610 x 88	603	130
M905-223-008	610 x 1220 x 88	1,206	
M985-223-538	1220 x 1220 x 88	2,411	
M905-323-005	610 x 610 x 110	603	90
M905-323-008	610 x 1220 x 110	1,206	
M985-323-538	1220 x 1220 x 110	2,411	
M905-423-005	610 x 610 x 134	603	80
M905-423-008	610 x 1220 x 134	1,206	
M985-423-538	1220 x 1220 x 134	2,411	

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
U15 / ISO 55 U			
M907-223-005	610 x 610 x 88	603	140
M907-223-008	610 x 1220 x 88	1,206	
M987-223-538	1220 x 1220 x 88	2,411	
M907-323-005	610 x 610 x 110	603	99
M907-323-008	610 x 1220 x 110	1,206	
M987-323-538	1220 x 1220 x 110	2,411	
M907-423-005	610 x 610 x 134	603	85
M907-423-008	610 x 1220 x 134	1,206	
M987-423-538	1220 x 1220 x 134	2,411	
U16 / ISO 65 U			
M908-223-005	610 x 610 x 88	603	191
M908-223-008	610 x 1220 x 88	1,206	
M988-223-538	1220 x 1220 x 88	2,411	
M908-323-005	610 x 610 x 110	603	123
M908-323-008	610 x 1220 x 110	1,206	
M988-323-538	1220 x 1220 x 110	2,411	
M908-423-005	610 x 610 x 134	603	109
M908-423-008	610 x 1220 x 134	1,206	
M988-423-538	1220 x 1220 x 134	2,411	

**Other filter classifications are available upon request.*

AstroCel II S+

Product Overview

- HEPA grade air filtration media with superior strength and antimicrobial properties
- The filter media performance was tested against bacteria and virus
- Lowest possible pressure drop without compromising antimicrobial properties
- Made of fibreglass media immobilized with antimicrobial agents to combat harmful microorganisms
- New innovation media not only traps small particles, but also minimizes the number of microbes by inhibiting their growth and reproduction

Specification

EN1822	H13, H14
ISO 29463	ISO 35 H, ISO 45 H
JIS Z 2801*	100%**
ISO 18184*	99.9%**
Filter Depth (mm)	69, 93, 117
Media Type	Fibreglass with antimicrobial properties
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Both Sides, Upstream
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	Yes
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
MA574-223-005	610 x 610 x 69	603	115
MA574-223-008	610 x 1220 x 69	1,206	
MA574-323-005	610 x 610 x 93	603	85
MA574-323-008	610 x 1220 x 93	1,206	
MA574-423-005	610 x 610 x 117	603	75
MA574-423-008	610 x 1220 x 117	1,206	
H14 / ISO 45 H			
MA575-223-005	610 x 610 x 69	603	135
MA575-223-008	610 x 1220 x 69	1,206	
MA575-323-005	610 x 610 x 93	603	95
MA575-323-008	610 x 1220 x 93	1,206	
MA575-423-005	610 x 610 x 117	603	80
MA575-423-008	610 x 1220 x 117	1,206	

**The test on filter media was done in a controlled environment. Actual performance may differ in different conditions and environments.*
***The efficacy shown applies only to the tested specimens: COVID-19 (SARS-CoV-2), Influenza A virus (H1N1), Human Coronavirus 229E, Staphylococcus aureus, and Escherichia coli. All tests were conducted on media that had been exposed to specific viruses and bacteria within a specific regulated time period of 24 hours of contact time, aside from SARS-CoV-2, which had 30 minutes of contact time. Performance against other viruses and bacteria may vary.*

AstroCel III / S+

Product Overview

AstroCel III

- Ideal for demanding operating conditions in critical applications
- Longer service life
- Low energy consumption and lower resistance to airflow

AstroCel III S+

- HEPA grade air filtration media with superior strength and antimicrobial properties
- The filter media performance was tested against bacteria and virus
- Lowest possible pressure drop without compromising antimicrobial properties
- Made of fibreglass media immobilized with antimicrobial agents to combat harmful microorganisms
- New innovation media not only traps small particles, but also minimizes the number of microbes by inhibiting their growth and reproduction

Specification

EN1822	H13, H14
JIS Z 2801*	100%**
ISO 18184*	99.9%**
Filter Depth (mm)	292
Media Type	Fibreglass, Fibreglass with antimicrobial properties
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Stainless Steel, Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Special Size Available	No
Antimicrobial Available	Optional
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	70ºC

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13			
M370-206-004	610 x 305 x 292	1,700	250
M570-206-004	610 x 305 x 292	2,000	
M370-206-005	610 x 610 x 292	3,400	
M570-206-005	610 x 610 x 292	4,000	
H13 S+			
MA570-206-004	610 x 305 x 292	1,750	250
MA570-206-005	610 x 610 x 292	3,500	
H14			
M371-206-004	610 x 305 x 292	1,500	250
M571-206-004	610 x 305 x 292	1,750	
M371-206-005	610 x 610 x 292	3,000	
M571-206-005	610 x 610 x 292	3,500	

**The test on filter media was done in a controlled environment. Actual performance may differ in different conditions and environments.*
***The efficacy shown applies only to the tested specimens: COVID-19 (SARS-CoV-2), Influenza A virus (H1N1), Human Coronavirus 229E, Staphylococcus aureus, and Escherichia coli. All tests were conducted on media that had been exposed to specific viruses and bacteria within a specific regulated time period of 24 hours of contact time, aside from SARS-CoV-2, which had 30 minutes of contact time. Performance against other viruses and bacteria may vary.*

AstroCel VXL

Product Overview

- Highest efficiency to replace 292 mm depth compact filter
- Suitable and easy to improve IAQ
- Lightweight and easy to install
- Fully incinerable

Specification

EN1822	H13, H14
Filter Depth (mm)	304
Media Type	Fibreglass
Frame Material	Plastic
Seperator Style	Hot Melt
Gasket Material	PU
Faceguard	Yes
Special Size Available	No
Antimicrobial Available	Optional
Header Type	Single Header
Recommended Final Resistance	600 Pa
Max Operating Temperature	70°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13				
M336-440-203N	24 x 12 x 12	592 x 287 x 304	1,250	260
M336-440-202N	24 x 20 x 12	592 x 490 x 304	2,100	
M336-440-201N	24 x 24 x 12	592 x 592 x 304	2,500	
H14				
M336-443-203N	24 x 12 x 12	592 x 287 x 304	1,250	270
M336-443-202N	24 x 20 x 12	592 x 490 x 304	2,100	
M336-443-201N	24 x 24 x 12	592 x 592 x 304	2,500	

MEGAcel I ePTFE / SC / Lite

Product Overview

- Individually tested for certified performance
- Lower energy consumption - greater than 40% lower resistance as compared to 292 mm depth high capacity HEPA filters
- AAF ePTFE Filtration Technology media combines ultra-high efficiency with lowest pressure drop
- Highly resistant to corrosive environments (acids, alkalis, and organic substances)
- Negligible offgassing propoerties (boron, sodium, potassium, silicon)
- High tensile strength media, more resistant to rough handling in transportation and installation
- Withstands pressure up to 5,000 Pa

Specification

EN1822	H13, H14
Filter Depth (mm)	292
Media Type	ePTFE
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Stainless Steel, Aluminium
Separator Style	Aluminium
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Optional
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 ePTFE			
M5265-2022-004	610 x 305 x 292	1,700	200
M5265-2022-005	610 x 610 x 292	3,400	
H13 ePTFE SC			
M2565-2022-004	610 x 305 x 292	1,700	230
M2565-2022-005	610 x 610 x 292	3,400	
H13 ePTFE Lite			
M2765-2022-004	610 x 305 x 292	1,700	260
M2765-2022-005	610 x 610 x 292	3,400	
H14 ePTFE			
M5235-2022-004	610 x 305 x 292	1,700	250
M5235-2022-005	610 x 610 x 292	3,400	

MEGAcel I eFRM / SC

Product Overview

- Individually tested for certified performance
- Pharmaceutical grade eFRM Filtration Technology media is proven to be more durable than microglass, delivering superior performance
- Industry's first and only eFRM media to be Polyalphaolefin (PAO) compatible, with a higher PAO holding capacity compared to microglass media
- Superior durability and tensile strength, 84 times the pleated strength of microglass
- Chemical-resistant capabilities reduce media degradation in highly corrosive environments
- Exceptional water resistance compared to ultrafine microglass

Specification

EN1822	H13, H14
Filter Depth (mm)	292
Media Type	eFRM
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Stainless Steel, Aluminium
Separator Style	Aluminium
Gasket Material (Standard)	Neoprene
Gasket Material (Optional)	PU, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Optional
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	70°C
Air Filtration Certification	UL 900

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 eFRM			
M5465-5022-004N	610 x 305 x 292	1,700	200
M5465-5022-005N	610 x 610 x 292	3,400	
H13 eFRM SC			
M2665-2022-004	610 x 305 x 292	1,700	320
M2665-2022-005	610 x 610 x 292	3,400	
H14 eFRM			
M5435-5022-004N	610 x 305 x 292	1,700	245
M5435-5022-005N	610 x 610 x 292	3,400	

MEGAcel II ePTFE / SC / Lite

Product Overview

- Individually tested for certified performance
- Lowest pressure drop mini-pleat HEPA filter available
- AAF's high tensile strength ePTFE media is up to 84x stronger than micro fibreglass
- Highly resistant to corrosive environments (acids, alkalis and organic substances)
- Near-zero off-gassing properties

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	50, 69
Media Type	ePTFE
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 ePTFE / ISO 35 H			
M5741-4223-004	610 x 305 x 50	301	50
M5741-4223-005	610 x 610 x 50	603	
M5741-4223-007	610 x 915 x 50	904	
M5741-4223-008	610 x 1220 x 50	1,206	
H13 ePTFE SC / ISO 35 H			
M5741-9233-004	610 x 305 x 50	301	105
M5741-9233-005	610 x 610 x 50	603	
M5741-9233-007	610 x 915 x 50	904	
M5741-9233-008	610 x 1220 x 50	1,206	
M5742-9333-004	610 x 305 x 69	301	70
M5742-9333-005	610 x 610 x 69	603	
M5742-9333-007	610 x 915 x 69	904	
M5742-9333-008	610 x 1220 x 69	1,206	
H13 ePTFE Lite / ISO 35 H			
M5742-8133-004	610 x 305 x 69	301	95
M5742-8133-005	610 x 610 x 69	603	
M5742-8133-007	610 x 915 x 69	904	
M5742-8133-008	610 x 1220 x 69	1,206	
H14 ePTFE / ISO 45 H			
M5751-4223-004	610 x 305 x 50	301	60
M5751-4223-005	610 x 610 x 50	603	
M5751-4223-007	610 x 915 x 50	904	
M5751-4223-008	610 x 1220 x 50	1,206	

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H14 ePTFE SC / ISO 45 H			
M5751-9233-004	610 x 305 x 50	301	110
M5751-9233-005	610 x 610 x 50	603	
M5751-9233-007	610 x 915 x 50	904	
M5751-9233-008	610 x 1220 x 50	1,206	
M5752-9333-004	610 x 305 x 69	301	75
M5752-9333-005	610 x 610 x 69	603	
M5752-9333-007	610 x 915 x 69	904	
M5752-9333-008	610 x 1220 x 69	1,206	
H14 ePTFE Lite / ISO 45 H			
M5752-8233-004	610 x 305 x 69	301	110
M5752-8233-005	610 x 610 x 69	603	
M5752-8233-007	610 x 915 x 69	904	
M5752-8233-008	610 x 1220 x 69	1,206	
U15 ePTFE / ISO 55 U			
M5771-4223-004	610 x 305 x 50	301	70
M5771-4223-005	610 x 610 x 50	603	
M5771-4223-007	610 x 915 x 50	904	
M5771-4223-008	610 x 1220 x 50	1,206	
U16 ePTFE / ISO 65 U			
M5781-4223-004	610 x 305 x 50	301	85
M5781-4223-005	610 x 610 x 50	603	
M5781-4223-007	610 x 915 x 50	904	
M5781-4223-008	610 x 1220 x 50	1,206	

MEGAcel II eFRM / SC

Product Overview

- Individually tested for certified performance
- Pharmaceutical grade eFRM Filtration Technology media is proven to be more durable than microglass, delivering superior performance
- Industry's first and only eFRM media to be Polyalphaolefin (PAO) compatible, with a higher PAO holding capacity compared to microglass media
- Superior durability and tensile strength, 84 times the pleated strength of microglass
- Chemical-resistant capabilities reduce media degradation in highly corrosive environments
- Exceptional water resistance compared to ultrafine microglass

Specification

EN1822	H13, H14
ISO 29463	ISO 35 H, ISO 45 H
Filter Depth (mm)	50, 69
Media Type	eFRM
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Upstream, Both Sides
Faceguard	Both Sides
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certification	UL 900

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 eFRM / ISO 35 H			
M5741-4423-004	610 x 305 x 50	301	70
M5741-4423-005	610 x 610 x 50	603	
M5741-4423-007	610 x 915 x 50	904	
M5741-4423-008	610 x 1220 x 50	1,206	
H13 eFRM SC / ISO 35 H			
M5741-9033-005	610 x 610 x 50	603	110
M5741-9033-008	610 x 1220 x 50	1,206	
M5742-9133-005	610 x 610 x 69	603	85
M5742-9133-008	610 x 1220 x 69	1,206	
H14 eFRM / ISO 45 H			
M5751-4423-004	610 x 305 x 50	301	80
M5751-4423-005	610 x 610 x 50	603	
M5751-4423-007	610 x 915 x 50	904	
M5751-4423-008	610 x 1220 x 50	1,206	
H14 eFRM SC / ISO 45 H			
M5751-9033-005	610 x 610 x 50	603	135
M5751-9033-008	610 x 1220 x 50	1,206	
M5752-9133-005	610 x 610 x 69	603	105
M5752-9133-008	610 x 1220 x 69	1,206	

MEGAcel III ePTFE / eFRM

Product Overview

- Individually tested for certified performance
- Pharmaceutical grade eFRM Filtration Technology media is proven to be more durable than microglass, delivering superior performance
- Industry's first and only eFRM media to be Polyalphaolefin (PAO) compatible, with a higher PAO holding capacity compared to microglass media
- Superior durability and tensile strength, 84 times the pleated strength of microglass
- Chemical-resistant capabilities reduce media degradation in highly corrosive environments
- Exceptional water resistance compared to ultrafine microglass

Specification

EN1822	H13, H14
Filter Depth (mm)	292
Media Type	ePTFE, eFRM
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Stainless Steel, Aluminium
Separator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position (Standard)	Downstream
Gasket Position (Optional)	Both Sides, Upstream
Special Size Available	No
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	70ºC

Product Information

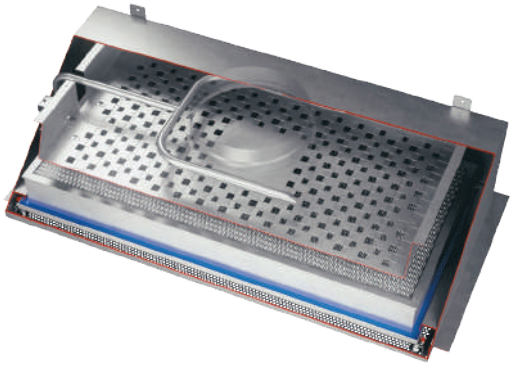
Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 ePTFE			
M430-206-004	610 x 305 x 292	2,000	150
M430-206-005	610 x 610 x 292	4,000	
H13 eFRM			
M450-206-004	610 x 305 x 292	2,000	200
M450-206-005	610 x 610 x 292	4,000	
H14 ePTFE			
M431-206-004	610 x 305 x 292	2,000	150
M431-206-005	610 x 610 x 292	4,000	
H14 eFRM			
M451-206-004	610 x 305 x 292	2,000	200
M451-206-005	610 x 610 x 292	4,000	

ULPA & HEPA Modules

AstroHood S-I

Product Overview

- Slide damper design allows for superior airflow distribution and fine adjustment
- Roomside replaceable HEPA filter for quick and easy maintenance
- Airflow adjustment and testing also available from roomside
- Continuous seal welding eliminates leak paths and adds strength
- Easy lay-in installation in a standard tee-bar ceiling
- Adaptable for horizontal or exhaust applications
- Gel seal design prevents bypass/leakage
- Lightweight and corrosion resistant housing
- Fully welded



Filter Specification

EN1822	H14
Filter Depth (mm.)	69, 93
Media Type	Fibreglass, eFRM
Frame Material	Aluminium
Separator Style	Hot Melt
Gasket Material	Gel
Gasket Position	Downstream
Faceguard Position	Both Sides
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[1]

Housing Specification

Housing Depth (mm.)	250
Housing Material	Stainless Steel
Supply Air Grille (Standard)	Perforated
Supply Air Grille (Optional)	Swirl, Directional
Supply Air Grille Material (Standard)	Stainless Steel
Supply Air Grille Material (Optional)	GI Finshed with Epoxy Coated, Aluminium
Inlet Diffuser	ESD damper
Top Material	Stainless Steel
Special Size Available	Yes
Aerosol Injection Port	Yes
Upstream Concentration Port	Yes

Housing Information

Article No.	Actual Housing Size* mm (H x W x D)	Inlet Size mm (H x W)	Actual Filter Size mm (H x W)
E1040001	480 x 480 x 250	250 x 250	420 x 420
E1040014	630 x 630 x 250	320 x 250	570 x 570
E1040003	695 x 695 x 250	320 x 320	635 x 635
E1040004	760 x 760 x 250	320 x 320	700 x 700
E1040015	850 x 850 x 250	400 x 320	790 x 790

**Excluded flange. Flange size is 20 mm.*

Filter Information

Article No.	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AstroCel II			
H1041016	420 x 420 x 69	300	165
H1041017	570 x 570 x 69	600	
H1041018	635 x 635 x 69	780	
H1041019	700 x 700 x 69	970	
H1041020	790 x 790 x 69	1,220	
H1041021	420 x 420 x 93	500	200
H1041022	570 x 570 x 93	1,000	
H1041023	635 x 635 x 93	1,250	
H1041024	700 x 700 x 93	1,500	
H1041025	790 x 790 x 93	2,000	
MEGAcel II eFRM			
H2101011	420 x 420 x 93	500	110
H2101012	570 x 570 x 93	1,000	
H2101013	635 x 635 x 93	1,250	
H2101014	700 x 700 x 93	1,500	
H2101015	790 x 790 x 93	2,000	

[1]FM 4920 certificate is only applicable to filters with silicone gel applied on fibreglass media.
**Other filter classifications are available upon request.*

AstroHood S-II

Product Overview

- Room side replaceable filter access
- Leak free housing with fully welded corners
- Easy access for filter testing
- Available with microglass HEPA or ULPA media or extremely durable, low pressure drop eFRM
- Aerosol injection and upstream port for in-situ test are available

Distribution Plate

Radial Damper

Filter Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	69
Media Type (Standard)	Fibreglass
Media Type (Optional)	eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material (Standard)	PU Gel
Gasket Material (Optional)	Silicone Gel
Gasket Position	Downstream
Faceguard Position	Both Sides
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[1]

Housing Specification

Housing Depth (mm)	300
Housing Material	Stainless Steel
Supply Air Grille Material	Stainless Steel
Supply Air Grille Type (Standard)	Perforated
Supply Air Grille Type (Optional)	Swirl
Inlet Collar (mm)	250, 300
Inlet Diffuser (Standard)	Adjustable Distribution Plate
Inlet Diffuser (Optional)	Adjustable Radial Damper
Special Size Available	Yes

Housing Information

Part Number	Actual Housing Size mm (H x W x D)	Actual Filter Size mm (H x W x D)
M135-31110-1003P	771 x 771 x 300	610 x 610 x 69
M135-31110-1006P	771 x 1381 x 300	610 x 1220 x 69

Filter Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M994-203-005	610 x 610 x 69	603	104
M994-203-008	610 x 1220 x 69	1,206	
H14 / ISO 45 H			
M995-203-005	610 x 610 x 69	603	130
M995-203-008	610 x 1220 x 69	1,206	

[1]FM 4920 certificate is only applicable to filters with silicone gel applied on fibreglass media.
**Other filter classifications are available upon request.*

AstroCel TM
AstroHood S-III

Product Overview

- Low profile
- Lightweight anodised extruded aluminium body
- Available in microglass HEPA or ULPA media
- Individually tested for certified performance
- One-piece aluminium top with integral duct collar connector
- Adjustable or prefixed air entry distribution plate
- Suitable for tee grid

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	125, 152, 175
Media Type	Fibreglass
Frame Material	Aluminium
Separator Style	Hot Melt
Faceguard Position	Downstream
Inlet Collar (mm)	250, 300
Inlet Diffuser	Adjustable Distribution Plate
Top Material (Standard)	Galvalume
Top Material (Optional)	Aluminium, Stainless Steel
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M594-170-043	600 x 600 x 125	583	104
M594-170-005	610 x 610 x 125	603	
M594-170-702	600 x 900 x 125	875	
M594-170-007	610 x 915 x 125	904	
M594-170-006	600 x 1210 x 125	1,176	
M594-170-008	610 x 1220 x 125	1,206	
M594-270-043	600 x 600 x 152	583	104
M594-270-005	610 x 610 x 152	603	
M594-270-702	600 x 900 x 152	875	
M594-270-007	610 x 915 x 152	904	
M594-270-006	600 x 1210 x 152	1,176	
M594-270-008	610 x 1220 x 152	1,206	
M594-470-043	600 x 600 x 175	583	75
M594-470-005	610 x 610 x 175	603	
M594-470-702	600 x 900 x 175	875	
M594-470-007	610 x 915 x 175	904	
M594-470-006	600 x 1210 x 175	1,176	
M594-470-008	610 x 1220 x 175	1,206	

AstroCel TM
AstroHood S-III

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H14 / ISO 45 H			
M595-170-043	600 x 600 x 125	583	130
M595-170-005	610 x 610 x 125	603	
M595-170-702	600 x 900 x 125	875	
M595-170-007	610 x 915 x 125	904	
M595-170-006	600 x 1210 x 125	1,176	
M595-170-008	610 x 1220 x 125	1,206	
M595-270-043	600 x 600 x 152	583	130
M595-270-005	610 x 610 x 152	603	
M595-270-702	600 x 900 x 152	875	
M595-270-007	610 x 915 x 152	904	
M595-270-006	600 x 1210 x 152	1,176	
M595-270-008	610 x 1220 x 152	1,206	
M595-470-043	600 x 600 x 175	583	90
M595-470-005	610 x 610 x 175	603	
M595-470-702	600 x 900 x 175	875	
M595-470-007	610 x 915 x 175	904	
M595-470-006	600 x 1210 x 175	1,176	
M595-470-008	610 x 1220 x 175	1,206	
U15 / ISO 55 U			
M597-170-043	600 x 600 x 125	583	140
M597-170-005	610 x 610 x 125	603	
M597-170-702	600 x 900 x 125	875	
M597-170-007	610 x 915 x 125	904	
M597-170-006	600 x 1210 x 125	1,176	
M597-170-008	610 x 1220 x 125	1,206	
M597-270-043	600 x 600 x 152	583	140
M597-270-005	610 x 610 x 152	603	
M597-270-702	600 x 900 x 152	875	
M597-270-007	610 x 915 x 152	904	
M597-270-006	600 x 1210 x 152	1,176	
M597-270-008	610 x 1220 x 152	1,206	
M597-470-043	600 x 600 x 175	583	99
M597-470-005	610 x 610 x 175	603	
M597-470-702	600 x 900 x 175	875	
M597-470-007	610 x 915 x 175	904	
M597-470-006	600 x 1210 x 175	1,176	
M597-470-008	610 x 1220 x 175	1,206	
U16 / ISO 65 U			
M598-170-043	600 x 600 x 125	583	191
M598-170-005	610 x 610 x 125	603	
M598-170-702	600 x 900 x 125	875	
M598-170-007	610 x 915 x 125	904	
M598-170-006	600 x 1210 x 125	1,176	
M598-170-008	610 x 1220 x 125	1,206	
M598-270-043	600 x 600 x 152	583	191
M598-270-005	610 x 610 x 152	603	
M598-270-702	600 x 900 x 152	875	
M598-270-007	610 x 915 x 152	904	
M598-270-006	600 x 1210 x 152	1,176	
M598-270-008	610 x 1220 x 152	1,206	
M598-470-043	600 x 600 x 175	583	123
M598-470-005	610 x 610 x 175	603	
M598-470-702	600 x 900 x 175	875	
M598-470-007	610 x 915 x 175	904	
M598-470-006	600 x 1210 x 175	1,176	
M598-470-008	610 x 1220 x 175	1,206	

**Other filter classifications are available upon request.*
***Above rated initial resistance does not include module construction.*

AstroHood S-III RSR-III

Product Overview

- Visually pleasing room side design
- Leak free module - extruded aluminium material with fully welded corners
- Available for gasket or gel seal filter
- Tool free filter and supply air grille installation
- Prefixed air entry distribution plate
- Hygienic design - no gap between supply air grille and module
- Standard and high capacity filters are interchangeable
- Perforated or Swirl supply air grille available
- No centre divider - increase filter area and unrestricted airflow uniformity
- Patent pending test port providing excellent airflow uniformity

Filter Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	117, 128
Media Type (Standard)	Fibreglass
Media Type (Optional)	ePTFE, eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material (Standard)	PU, PU Gel
Gasket Material (Optional)	Neoprene, EPDM, Silicone Gel
Gasket Position	Upstream
Faceguard Position	Both Sides
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[1]

Housing Specification

Housing Depth (mm)	258
Housing Material	Aluminium
Supply Air Grille	Perforated, Swirl
Supply Air Grille Material (Standard)	GI Finished with Epoxy Coated
Supply Air Grille Material (Optional)	Stainless Steel
Inlet Collar (mm)	200, 250, 300
Inlet Diffuser	Prefixed Distribution Plate
Top Material (Standard)	Galvalume
Top Material (Optional)	Aluminium, Stainless Steel
Special Size Available	Yes

Housing Information

Part Number	Actual Module Size mm (H x W x D)	Actual Filter Size mm (H x W x D)	Supply Air Grille
Gasket seal housing			
M13D2-11G30-319GP	570 x 570 x 258	502 x 502 x 117	Perforated
M13D2-11G30-1811GP	570 x 900 x 258	502 x 832 x 117	
M13D2-12G30-2812GP	570 x 1140 x 258	502 x 1072 x 117	
M13D2-11G30-319GS	570 x 570 x 258	502 x 502 x 117	Swirl
Gel seal housing			
M13G2-11G30-319GP	570 x 570 x 258	506 x 506 x 128	Perforated
M13G2-11G30-1811GP	570 x 900 x 258	506 x 836 x 128	
M13G2-12G30-2812GP	570 x 1140 x 258	506 x 1076 x 128	
M13G2-11G30-319GS	570 x 570 x 258	506 x 506 x 128	Swirl

AstroHood S-III RSR-III

Filter Information

Part Number	Actual Filter Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Gasket Material
H13 / ISO 35 H				
MF5742-1131-1793	502 x 502 x 117	600	135	PU
MF5742-1131-2810	502 x 832 x 117	900		
MF5742-1131-2825	502 x 1072 x 117	1,200		
MF5744-1131-1793	502 x 502 x 117	1,050	200	
MF5744-1131-2810	502 x 832 x 117	1,650		
MF5744-1131-2825	502 x 1072 x 117	2,200		
MF5042-4131-2928	506 x 506 x 128	600	135	PU Gel
MF5042-4131-2929	506 x 836 x 128	900		
MF5042-4131-2930	506 x 1076 x 128	1,200		
MF5044-4131-2828	506 x 506 x 128	1,050	200	
MF5044-4131-2829	506 x 836 x 128	1,650		
MF5044-4131-2830	506 x 1076 x 128	2,200		
H14 / ISO 45 H				
MF5752-1131-1793	502 x 502 x 117	600	145	PU
MF5752-1131-2810	502 x 832 x 117	900		
MF5752-1131-2825	502 x 1072 x 117	1,200		
MF5754-1131-1793	502 x 502 x 117	1,050	210	
MF5754-1131-2810	502 x 832 x 117	1,650		
MF5754-1131-2825	502 x 1072 x 117	2,200		
MF5052-4131-2928	506 x 506 x 128	600	145	PU Gel
MF5052-4131-2929	506 x 836 x 128	900		
MF5052-4131-2930	506 x 1076 x 128	1,200		
MF5054-4131-2928	506 x 506 x 128	1,050	210	
MF5054-4131-2929	506 x 836 x 128	1,650		
MF5054-4131-2930	506 x 1076 x 128	2,200		

[1]FM 4920 certificate is only applicable to filters with both silicon gel and dry seal gaskets applied to fibreglass media.
**Filter sitting area corner of the module that is smaller than 570x570mm will be PU sealed and not welded.*
***Other filter classifications are available upon request.*

AstroHood S-III RSR-IV

Product Overview

- Visually pleasing room side design
- Extruded aluminium module with fully welded corners, providing a leak free constructions
- Gel seal for optimum integrity
- Tool free filter installation
- Prefixed air entry distribution plate
- Hygenic design - no gap between filter and module
- Multipurpose suspension brackets - can be positioned on any point on module perimeter
- No centre divider - increase filter area and unrestricted airflow uniformity
- Patent pending test port providing excellent airflow uniformity

Filter Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	81
Media Type (Standard)	Fibreglass
Media Type (Optional)	ePTFE, eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material (Standard)	PU Gel
Gasket Material (Optional)	Silicone Gel
Gasket Position	Upstream
Faceguard Position	Downstream
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[1]

Housing Specification

Housing Depth (mm)	135
Housing Material	Aluminium
Inlet Collar (mm)	200, 250, 300
Inlet Diffuser	Prefixed Distribution Plate
Top Material (Standard)	Galvalume
Top Material (Optional)	Aluminium, Stainless Steel
Special Size Available	Yes

Housing Information

Part Number	Actual Module Size mm (H x W x D)	Actual Filter Size mm (H x W x D)
M6902-11G30-593	593 x 593 x 135	600 x 600 x 81
M6902-11G30-2817	593 x 893 x 135	600 x 900 x 81
M6902-12G30-2818	593 x 1193 x 135	600 x 1200 x 81

Filter Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
MF8145-4131-333	600 x 600 x 81	600	120
MF8145-4131-702	600 x 900 x 81	900	
MF8145-4131-300	600 x 1200 x 81	1,200	
H14 / ISO 45 H			
MF8155-4131-333	600 x 600 x 81	600	145
MF8155-4131-702	600 x 900 x 81	900	
MF8155-4131-300	600 x 1200 x 81	1,200	

[1]FM 4920 certificate is only applicable to filters with silicone gel applied on fibreglass media.
**Other filter classifications are available upon request.*

MEGAcel TM ePTFE

Product Overview

- AAF's high tensile strength ePTFE media is up to 84x stronger than micro fibreglass
- Lowest pressure drop mini-pleat HEPA filter available
- Highly resistant to corrosive environments (acids, alkalis and organic substances)
- Near-zero off-gassing properties
- One-piece aluminium top with integral duct collar connector
- Lightweight anodised extruded aluminium body
- Individually tested for certified performance

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	125, 152
Media Type (Standard)	ePTFE
Frame Material	Aluminium
Separator Style	Hot Melt
Faceguard Position	Downstream
Inlet Collar (mm)	250, 300
Inlet Diffuser	Adjustable Distribution Plate
Top Material (Standard)	Galvalume
Top Material (Optional)	Aluminium, Stainless Steel
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M594-770-333	600 x 600 x 125	583	50
M594-770-005	610 x 610 x 125	603	
M594-770-315	600 x 1210 x 125	1,176	
M594-770-008	610 x 1220 x 125	1,206	
H14 / ISO 45 H			
M595-770-333	600 x 600 x 125	583	60
M595-770-005	610 x 610 x 125	603	
M595-770-315	600 x 1210 x 125	1,176	
M595-770-008	610 x 1220 x 125	1,206	
U15 / ISO 55 U			
M597-770-333	600 x 600 x 125	583	70
M597-770-005	610 x 610 x 125	603	
M597-770-315	600 x 1210 x 125	1,176	
M597-770-008	610 x 1220 x 125	1,206	
U16 / ISO 65 U			
M598-770-333	600 x 600 x 125	583	85
M598-770-005	610 x 610 x 125	603	
M598-770-008	600 x 1210 x 125	1,176	
M598-770-315	610 x 1220 x 125	1,206	

**Above rated initial resistance doe not include module construction.*

MEGAcel TM eFRM

Product Overview

- Pharmaceutical grade eFRM Filtration Technology media is proven to be more durable than microglass, delivering superior performance
- Industry's first and only eFRM media to be Polyalphaolefin (PAO) compatible, with a higher PAO holding capacity compared to microglass media
- Superior durability and tensile strength, 84 times the pleated strength of microglass
- Chemical-resistant capabilities reduce media degradation in highly corrosive environments
- Exceptional water resistance compared to ultrafine microglass
- One-piece aluminium top with integral duct collar connector
- Lightweight anodised extruded aluminium body
- Individually tested for certified performance

Specification

EN1822	H13, H14
ISO 29463	ISO 35 H, ISO 45 H
Filter Depth (mm)	125, 152
Media Type (Standard)	eFRM
Frame Material	Aluminium
Separator Style	Hot Melt
Faceguard Position	Downstream
Inlet Collar (mm)	250, 300
Inlet Diffuser	Adjustable Distribution Plate
Top Material (Standard)	Galvalume
Top Material (Optional)	Aluminium, Stainless Steel
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC

Product Information

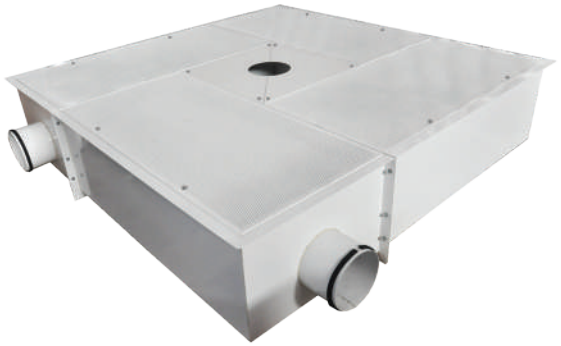
Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H			
M594-1370-043	600 x 600 x 125	583	70
M594-1370-005	610 x 610 x 125	603	
M594-1370-006	600 x 1210 x 125	1,176	
M594-1370-008	610 x 1220 x 125	1,206	
H14 / ISO 45 H			
M595-1370-043	600 x 600 x 125	583	80
M595-1370-005	610 x 610 x 125	603	
M595-1370-006	600 x 1210 x 125	1,176	
M595-1370-008	610 x 1220 x 125	1,206	

**Above rated initial resistance does not include module construction.*

CRU II - Operating Theatre Ceiling Module

Product Overview

- Modular design, easy assembly and installation at site
- Designed for operating theatre, providing laminar airflow
- Rust free - Galvanised steel completed with epoxy powder coated
- Room side replaceable HEPA filters
- Airtight construction
- Perforated diffuser completed with epoxy powder coated
- Sample port available
- Airtight surgical light path
- Unidirectional airflow



Filter Specification

EN1822	H13, H14
ISO 29463	ISO 35 H, ISO 45 H
Filter Depth (mm)	69
Media Type	eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material (Standard)	PU
Gasket Material (Optional)	Neoprene, EPDM
Gasket Position	Upstream
Faceguard Position	Both Sides
Antimicrobial Available	No
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900

Housing Specification

Housing Depth (mm)	400
Housing Material	GI Finished with Epoxy Coated
Supply Air Grille	Perforated
Supply Air Grille Material	GI Finished with Epoxy Coated
Inlet Collar (mm)	200
Inlet Diffuser	Prefixed Diffusion Plate
Special Size Available	Yes

Housing Information

Part Number	No. of Module	Actual Size mm (H x W x D)	Rated Airflow (CMH)		
			at 0.25 m/s	at .30 m/s	at 0.45 m/s
M154-514814-1001PN	4	1880 x 1880 x 400	2,339	2,806	4,209
M154-514814-1002PN	2 + 4	1880 x 2480 x 400	3,165	3,798	5,697
M154-514814-1003PN	2 + 4	2480 x 2480 x 400	4,334	5,201	7,802
M154-514814-1004PN	4 + 4	3080 x 3080 x 400	7,016	8,419	12,628

Filter Information

Part Number	Actual Size mm (H x W x D)	Required Quantity	Filter Class	Rated Initial Resistance (Pa)
CRU-II 1880 x 1880 x 400				
M5752-4413-298	550 x 1150 x 69	4	H14	80
CRU-II 1880 x 2480 x 400				
M5752-4413-2878	550 x 850 x 69	2	H14	80
M5752-4413-298	550 x 1150 x 69	4		
CRU-II 2480 x 2480 x 400				
M5752-4413-2878	550 x 850 x 69	2	H14	80
M5752-4413-3274	850 x 1150 x 69	4		
CRU-II 3080 x 3080 x 400				
M5752-4413-298	550 x 1150 x 69	4	H14	80
M5752-4413-549	1150 x 1150 x 69			

**Other filter classifications are available upon request.*

AstroFan FFU - AC

Product Overview

- Low energy consumption
- Backward curved motorized impeller uses minimal electricity
- Variable speed controller
- Low noise
- Sturdy construction
- Bottom access

Filter Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	69, 93, 117
Media Type	Fibreglass, ePTFE, eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material	PU, Neoprene, EPDM
Gasket Position	Upstream, Downstream, Both Sides
Faceguard Position	Both Sides
Antimicrobial Available	Optional
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[1]

Housing Specification

Housing Depth (mm)	275 - 315
Housing Material (Standard)	Galvalume, Stainless Steel
Housing Material (Optional)	Aluminium
Power Supply	1Ph/50/60Hz/230VAC
Air Velocity	0.45 m/s +/- 20%
Sound Pressure Level	<60
Pre-filter	Optional
Pressure Port	Optional
Special Size Available	Yes
Installation Method	CRM Ceiling Grid

Product Information

Part Number	Actual Housing Size mm (H x W x D)	Actual Filter Size mm (H x W)	Rated Airflow (CMH)
Galvalume Casing			
M762-0G0-149	575 x 575 x 275	570 x 570	526
M762-0G0-25	600 x 600 x 275	595 x 595	574
M762-0G0-05	615 x 615 x 275	610 x 610	603
M762-1G0-34	575 x 1175 x 295	570 x 1170	1,080
M762-1G0-11	600 x 1210 x 295	595 x 1205	1,161
M762-1G0-41	615 x 1225 x 295	610 x 1220	1,206
Stainless Steel Casing			
M760-0G0-149	575 x 575 x 275	570 x 570	526
M760-0G0-25	600 x 600 x 275	595 x 595	574
M760-0G0-05	615 x 615 x 275	610 x 610	603
M760-1G0-34	575 x 1175 x 295	570 x 1170	1,080
M760-1G0-11	600 x 1210 x 295	595 x 1205	1,161
M760-1G0-41	615 x 1225 x 295	610 x 1220	1,206

[1]FM 4920 certificate is only applicable to filters with fibreglass media.
**Above part numbers are applicable to housing only, filter not included.*
***Top access is also available upon request.*

AstroFan FFU - EC

Product Overview

- Comes with smart electronic control (EC) FFU system (AstroDrive)
- Full interface control, vector scaling
- High speed signal feedback feature
- Energy-efficient EC motor compared to AC alternatives
- Whisper-quiet operation compared to AC alternatives
- Easy installation and set up at the site
- AstroDrive can control up to 62,992 FFU units in one installation
- Alternative software can control up to 10,800 FFU units in one installation
- Good alternative solution for existing EC control FFU

Filter Specification

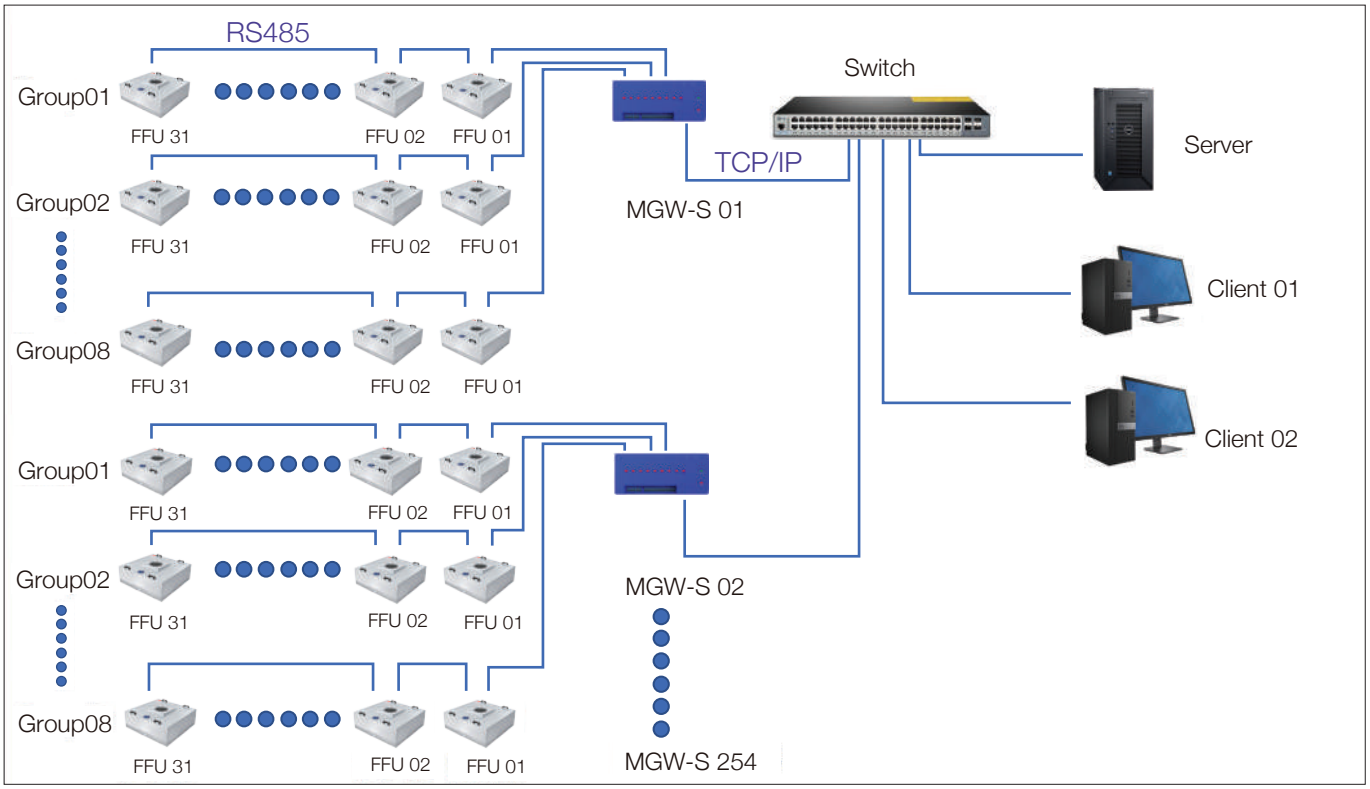
EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Filter Depth (mm)	69, 93, 117
Media Type	Fibreglass, ePTFE, eFRM
Frame Material	Aluminium
Seperator Style	Hot Melt
Gasket Material	PU, Neoprene, EPDM
Gasket Position	Upstream, Downstream, Both Sides
Faceguard Position	Both Sides
Antimicrobial Available	Optional
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC
Air Filtration Certificate	UL 900, FM 4920[3]

Housing Specification

Housing Depth (mm)	295, 315
Housing Material	Galvalume, Stainless Steel, Aluminium
Power Supply	1Ph/50/60Hz/230VAC
Air Velocity	0.45 m/s +/- 20%
Control Method[1]	AstroDrive Software
Sound Pressure Level[2]	53 - 57 dBA
Pre-filter	Optional
Pressure Port	Optional
Special Size Available	Yes
Installation Method	CRM Ceiling Grid

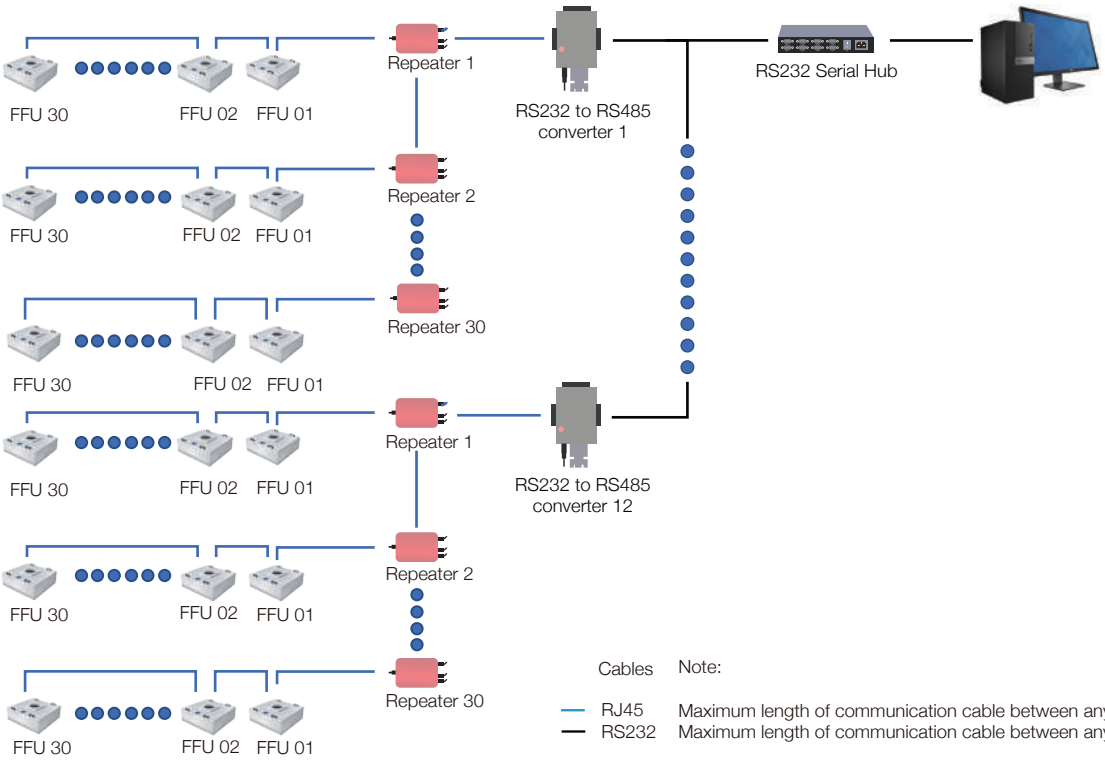
[1]For additional information on the various AstroFan FFU-EC solutions, please contact our sales representative.
[2]SPL are tested 1.5m below the FFU, using 1175x1175x315mm Housing Size with AstroCel II H14 1170x1170x69mm, at Air Velocity 0.45 m/s.
[3]FM 4920 certificate is only applicable to filters with fibreglass media.

AstroDrive Electronic Connection Diagram of Control Interface and Gateway



AstroFan FFU - EC

Alternative Electronic Connection Diagram of Control Interface and Gateway



Housing Information

Actual Housing Size mm (H x W x D)	Actual Filter Size mm (H x W)	Rated Airflow (CMH)
575 x 575 x 295	570 x 570	526
575 x 1175 x 295	570 x 1170	1,080
1175 x 1175 x 315	1170 x 1170	2,218

**Top access and other sizes are also available upon request. Please contact our sales representatives for more information.*
***Above part numbers are applicable to housing only, filter not included.*

FM-II

Product Overview

- Self-contained fan/filter module
- Low off-gassing components
- Variable speed controller
- Low energy consumption
- High total static pressure at full airflow
- Low noise level

Specification

EN1822	H13 - U17
ISO 29463	ISO 35 H - ISO 75 U
Housing Depth (mm)	295 - 335
Media Type (Standard)	Fibreglass
Media Type (Optional)	ePTFE, eFRM
Housing Material (Standard)	Aluminium
Housing Material (Optional)	Stainless Steel
Separator Style	Hot Melt
Faceguard Position	Both Sides
Power Supply	230V 1 phase 50/60Hz
Speed Controller (Standard)	Triac
Speed Controller (Optional)	TSC-10
Noise Level (dBA)	<60
Pre-filter	Optional
Pressure Port	Optional
Electrical Connection (Standard)	3 Meters Length with UK Plug
Electrical Connection (Optional)	Electrical Terminal Box
Special Size Available	Yes
Antimicrobial Available	Optional
Recommended Final Resistance	500 Pa
Max Operating Temperature	70ºC

Product Information

Part Number	Nominal Size Inches (H x W)	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
H13 / ISO 35 H				
M5361-1A2-150	24 x 48	575 x 1175 x 295	1,095	104
M5361-1A2-103		600 x 1210 x 295	1,176	
M5361-1A2-151		615 x 1225 x 295	1,220	
U15 / ISO 55 U				
M5361-1M2-150	24 x 48	575 x 1175 x 295	1,095	140
M5361-1M2-103		600 x 1210 x 295	1,176	
M5361-1M2-151		615 x 1225 x 295	1,220	

**Other filter classifications are available upon request.*

Kitchen Ecology Solution

Electrostatic Precipitator (ESP)

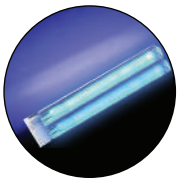
Product Overview

- Pre-filter collects larger particles
- Ionizer & Collector collect smaller particles
- Indicator lights for real-time status
- Easy maintainability
- Optional odour removal feature

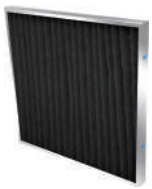
Specification

Efficiency	95% for 2 – 5µm @ 500 fpm
Housing Material	SPCC Steel Finished with Epoxy Coated
Collector Cell Material	Aluminium Alloy
Pre-filter Type	Galvanized Perforated Plate
UV Light	Yes
Carbon	Optional
Safety Interlock Switch	Yes
Oil Direct Discharge	Yes
Oil Drain Tray	Optional
Safety Endorsement	CE, IP55
Power Supply	220V / 1 / 50 Hz

Collector Cell



UV Light



Carbon Filter

Product Information

Part Number	Actual Size mm (L x W x H)	Rated Initial Resistance (Pa)	Rated Airflow (CMH)	Power (W)	Weight (Kg)
MAM-ESP30E1C	677 x 740 x 833	23	2,400 - 3,400	96	95
MAM-ESP40E1C	845 x 740 x 833		3,400 - 4,800	117	108
MAM-ESP50E1C	897 x 740 x 833		4,000 - 6,000	117	115
MAM-ESP60E1C	1187 x 740 x 833		4,800 - 6,800	192	140
MAM-ESP80E1C	1523 x 740 x 833		6,800 - 9,800	234	171
MAM-ESP100E1C	1627 x 740 x 833		8,000 - 12,000	262	183
MAM-ESP120E1C	2201 x 740 x 833		9,600 - 13,600	351	239
MAM-ESP150E1C	2357 x 740 x 833		12,000 - 18,000	393	235
MAM-ESP160E1C	1523 x 740 x 1536		13,600 - 19,200	468	324
MAM-ESP200E1C	1627 x 740 x 1536		16,000 - 24,000	524	306
MAM-ESP240E1C	2201 x 740 x 1536		19,200 - 28,800	702	456

**Resistance (Pa) indicated above refers to Collector Cell Resistance only.*
***Modular equipment available for higher airflow requirements.*

Containment System

AstroSafe BF-Series Gel Seal Bag-In/Bag-Out Housings

Product Overview

- Designed to accommodate both standard gel seal HEPA filters and carbon adsorbers
- Guaranteed to pass DOP and Freon in-place tests
- Side access bag-in/bag-out port that allows contaminated filters and carbon adsorbers to be removed without direct contact

BF1 - 1H 2W - 2 GGF - 304 - D1

Housing Series
BF1 = Bag-Out Type for Gel Seal Filters

Number of Filters High

Number of Filters Wide

Size Designator of Primary Filter
(see chart below)

Nominal Depth of Prefilter
2 = 2 inch deep Prefilter
4 = 4 inch deep Prefilter
6 = 6 inch deep Prefilter
Blank = No Prefilter

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

Access Door Arrangement
D1 = One Access Door
D2 = Two Access Doors, One per Side
D3 = Two Access Doors on One Side (one for primary filter, one for prefilter)
D4 = Four Access Doors, Two on Each Side (one for primary filter, one for prefilter)

Product Information

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
BF1-1H1W-2/4/6CC-304-D1*	18	15	14	60
BF1-1H1W-2/4/6CG-304-D1*	18	27	14	70
BF1-1H1W-2/4/6GC-304-D1*	30	15	14	80
BF1-1H1W-2/4/6GG-304-D1*	30	27	14	90
BF1-1H2W-GGF/12-304-D1	30	51	25	205
BF1-1H2W-GG16-304-D1	30	51	32⅝	225
BF1-1H2W-GG18-304-D1	30	51	32⅝	235
BF1-1H2W-2/4/6GGF/12-304-D1	30	51	33¼	220
BF1-1H2W-2/4/6GG16-304-D1	30	51	41	240
BF1-1H2W-2/4/6GG18-304-D1	30	51	41	250
BF1-1H2W-2/4/6GGF/12-304-D3	30	51	37½	275
BF1-1H2W-2/4/6GG16-304-D3	30	51	45¼	295
BF1-1H2W-2/4/6GG18-304-D3	30	51	45¼	300
BF1-1H2W-2/4/6GG-304-D1*	30	51	14	120
BF1-1H3W-GGF/12-304-D1	30	75	25	265
BF1-1H3W-GG16-304-D1	30	75	32⅝	290
BF1-1H3W-GG18-304-D1	30	75	32⅝	300
BF1-1H3W-2/4/6GGF/12-304-D1	30	75	33¼	280
BF1-1H3W-2/4/6GG16-304-D1	30	75	41	305
BF1-1H3W-2GG18-304-D1	30	75	41	320
BF1-1H3W-2/4/6GGF/12-304-D3	30	75	37½	350
BF1-1H3W-2/4/6GG16-304-D3	30	75	45¼	375
BF1-1H3W-2/4/6GG18-304-D3	30	75	45¼	390
BF1-1H3W-2/4/6GG-304-D1*	30	75	14	150

*These housings are designed to accommodate prefilters only.

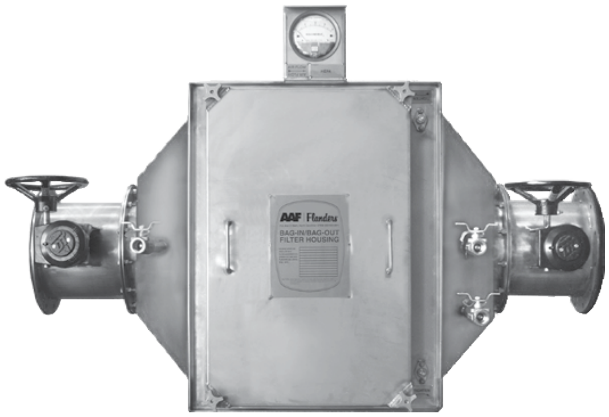
Filter Size Designator (HEPA Filters and Carbon Adsorbers) **Actual Filter Dimensions are Listed**
HEPA Filters
†CCD 12 x 12 x 5⅞
†CCF 12 x 12 x 11½
†CGF 12 x 24 x 11½
†GCF 24 x 12 x 11½
†GGF 24 x 24 x 11½
Carbon Adsorbers
†CC6 12 x 12 x 5⅞
†CC12 12 x 12 x 11½
†CG12 12 x 24 x 11½
†GC12 24 x 12 x 11½
†GG12 24 x 24 x 11½
†CG16 12 x 24 x 16
†GC16 24 x 12 x 16
†GG16 24 x 24 x 16
†GG18 24 x 24 x 18

†Insert 2, 4, or 6 to indicate 2″, 4″, or 6″ prefilter track.

AstroSafe BG-Series Gasket Seal Bag-In/Bag-Out Housings

Product Overview

- Side servicing filter housing designed for gasket seal filters
- Minimizing exposure to harmful contamination, this housing incorporates a ribbed bagging ring behind the access door, over which a PVC bag is attached
- Manufactured under stringent quality assurance controls



BG1 - 1H 2W - 2 GGF - 304 - D1

Housing Series
BG1 = Bag-Out Type for Gasket Seal Filters

Number of Filters High

Number of Filters Wide

Nominal Depth of Prefilter
2 = 2 inch deep Prefilter
4 = 4 inch deep Prefilter
6 = 6 inch deep Prefilter
Blank = No Prefilter

Size Designator of Primary Filter
(see chart below)

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

Access Door Arrangement
D1 = One Access Door
D2 = Two Access Doors, One per Side
D3 = Two Access Doors on One Side (one for primary filter, one for prefilter)
D4 = Four Access Doors, Two on Each Side (one for primary filter, one for prefilter)

Product Information

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
BG1-1H1W-2/4/6CC-304-D1*	18	15	14	60
BG1-1H1W-2/4/6CG-304-D1*	18	27	14	70
BG1-1H1W-2/4/6GC-304-D1*	30	15	14	80
BG1-1H1W-2/4/6GG-304-D1*	30	27	14	90
BG1-1H2W-GGF/12-304-D1	30	51	23	205
BG1-1H2W-GG16-304-D1	30	51	27½	225
BG1-1H2W-GG18-304-D1	30	51	29½	235
BG1-1H2W-2GGF/12-304-D1	30	51	26	220
BG1-1H2W-2GG16-304-D1	30	51	20½	240
BG1-1H2W-2GG18-304-D1	30	51	32½	250
BG1-1H2W-2/4/6GGF/12-304-D3	30	51	35¾	275
BG1-1H2W-2/4/6GG16-304-D3	30	51	40¼	295
BG1-1H2W-2/4/6GG18-304-D3	30	51	42¼	300
BG1-1H2W-2/4/6GG-304-D1*	30	51	14	120
BG1-1H3W-GGF/12-304-D1	30	75	23	265
BG1-1H3W-GG16-304-D1	30	75	27½	290
BG1-1H3W-GG18-304-D1	30	75	29½	300
BG1-1H3W-2GGF/12-304-D1	30	75	26	280
BG1-1H3W-2GG16-304-D1	30	75	30½	305
BG1-1H3W-2GG18-304-D1	30	75	32½	320
BG1-1H3W-2/4/6GGF/12-304-D3	30	75	35¾	350
BG1-1H3W-2/4/6GG16-304-D3	30	75	40¼	375
BG1-1H3W-2/4/6GG18-304-D3	30	75	42¼	390
BG1-1H3W-2/4/6GG-304-D1*	30	75	14	150

**These housings are designed to accommodate prefilters only.*

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
BG1-1H1W-CCD/6-304-D1**	18	15	17⅜	75
BG1-1H1W-CCF/12-304-D1	18	15	23	85
BG1-1H1W-CGF/12-304-D1	18	27	23	100
BG1-1H1W-CG16-304-D1	18	27	27½	115
BG1-1H1W-GCF/12-304-D1	30	15	23	120
BG1-1H1W-GC16-304-D1	30	15	27½	140
BG1-1H1W-GGF/12-304-D1***	30	27	23	145
BG1-1H1W-GG16-304-D1	30	27	27½	160
BG1-1H1W-GG18-304-D1	30	27	29½	165
BG1-1H1W-2CCF/12-304-D1	18	15	26	90
BG1-1H1W-2CGF/12-304-D1	18	27	26	115
BG1-1H1W-2CG16-304-D1	18	27	30½	125
BG1-1H1W-2GCF/12-304-D1	30	15	26	130
BG1-1H1W-2GC16-304-D1	30	15	30½	145
BG1-1H1W-2GGF/12-304-D1	30	27	26	155
BG1-1H1W-2GG16-304-D1	30	27	30½	170
BG1-1H1W-2GG18-304-D1	30	27	32½	175
BG1-1H1W-2/4/6CCF/12-304-D3	18	15	35¾	115
BG1-1H1W-2/4/6CGF/12-304-D3	18	27	35¾	145
BG1-1H1W-2/4/6CG16-304-D3	18	27	40¼	155
BG1-1H1W-2/4/6GCF/12-304-D3	30	15	35¾	160
BG1-1H1W-2/4/6GC16-304-D3	30	15	40¼	170
BG1-1H1W-2/4/6GGF/12-304-D3	30	27	35¾	185
BG1-1H1W-2/4/6GG16-304-D3	30	27	40¼	205
BG1-1H1W-2/4/6GG18-304-D3	30	27	42¼	210

***The D/6 in this model number represents the following model numbers:*
BG1-1H1W-CCD-304-D1 *to contain a HEPA filter*
BG1-1H1W-CC6-304-D1 *to contain a Carbon Adsorber*

****The F/12 in this model number represents the following model numbers:*
BG1-1H1W-GGF-304-D1 *to contain a HEPA filter*
BG1-1H1W-GG12-304-D1 *to contain a Carbon Adsorber*

Note: *For multi-high housings, just add the height dimension as needed.*

Filter Size Designator (HEPA Filters and Carbon Adsorbers) **Actual Filter Dimensions are Listed**
HEPA Filters
†CCD 12 x 12 x 5⅞
†CCF 12 x 12 x 11½
†CGF 12 x 24 x 11½
†GCF 24 x 12 x 11½
†GGF 24 x 24 x 11½
Carbon Adsorbers
†CC6 12 x 12 x 5⅞
†CC12 12 x 12 x 11½
†CG12 12 x 24 x 11½
†GC12 24 x 12 x 11½
†GG12 24 x 24 x 11½
†CG16 12 x 24 x 16
†GC16 24 x 12 x 16
†GG16 24 x 24 x 16
†GG18 24 x 24 x 18

†Insert 2, 4, or 6 to indicate 2″, 4″, or 6″ prefilter track.

AstroSafe G-Series Single Filter Housings

Product Overview

- Allows a single filter element (prefilter, HEPA filter, or gas adsorber) to be installed in a low CFM ventilation system
- Designed so that housing can be tested in place
- Accommodates various arrangements of inlet and outlet ports
- Filter-to-housing fluid seal is created by means of a continuous knife-edge in the housing

G1F - GGF - 304

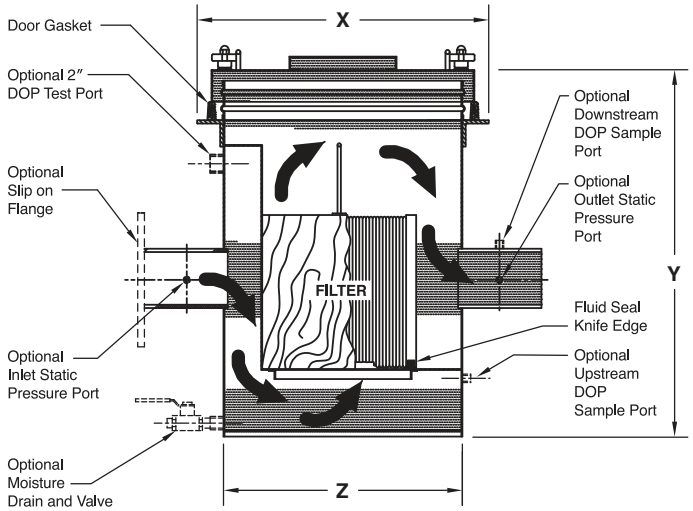
Housing Series/Type
G1F = Bag-Out Gel Seal
G1G = Bag-Out Gasket Seal
(for non-bag-out applications, delete bags and straps)

Filter Size
(see chart below)

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

Product Information

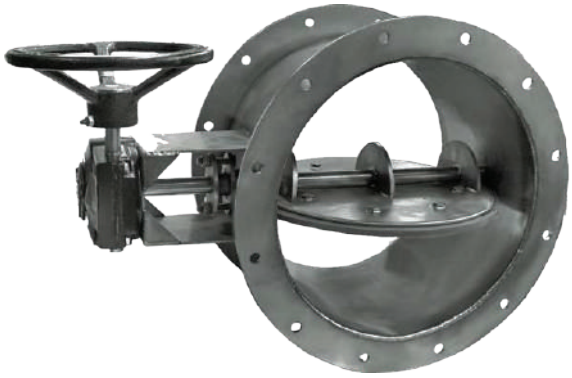
Part Number	Filter Size	Housing Dimensions (Inches) X	Y	Z	Filter Dimensions Inches (H x W x D)	Rated Capacity (CFM)
Filters						
G1F-CCD-304	CCD	22⅛	24	18⅛	12 x 12 x 5⅞	105
G1F-CCF-304	CCF	22⅛	24	18⅛	12 x 12 x 11½	160
G1F-GGD-304	GGD	40⅛	24	36⅛	24 x 24 x 5⅞	500
G1F-GGF-304	GGF	40⅛	24	36⅛	24 x 24 x 11½	1000
Adsorbers						
G1F-CC12-304	CC12	22⅛	24	18⅛	12 x 12 x 12¼	165
G1F-GG12-304	GG12	40⅛	24	36⅛	24 x 24 x 12¼	1000
G1F-GG16-304	GG16	40⅛	28	36⅛	24 x 24 x 16¾	1000
G1F-GG18-304	GG18	40⅛	28	36⅛	24 x 24 x 18¾	1250



AstroSafe Isolation Dampers

Product Overview

- Effective shut off and isolation of one or more tiers of filters
- Cost effective isolation of filter banks
- Special requirements may be satisfied through custom design



DBT - * - FB - 304 - 18

Damper Series
DBT = Damper, Bubble Tight

Actuator Options
M = Manual
P= Pneumatic
E = Electric

Blade
FB = Flat Blade

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

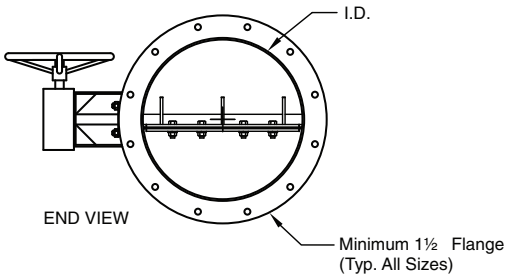
Damper Size
(see chart below)

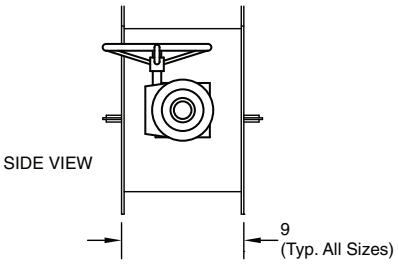
Product Information

Part Number	ID (Inches)	Diameter of Bolt Circle (Inches)	Number of Bolt Holes
DBT*-FB-304-6	5¾	8 1/16	8
DBT*-FB-304-8	7¾	10 1/16	8
DBT*-FB-304-10	9¾	12 1/16	12
DBT*-FB-304-12	11¾	14 1/16	12
DBT*-FB-304-14	13¾	16 1/16	16
DBT*-FB-304-16	15¾	18 1/16	16
DBT*-FB-304-18	17¾	20 1/16	16
DBT*-FB-304-20	19¾	22 1/16	20
DBT*-FB-304-22	21¾	24 1/16	20
DBT*-FB-304-24	23¾	26 1/16	24
DBT*-FB-304-26	25¾	28 1/16	24
DBT*-FB-304-28	27¾	30 1/16	24
DBT*-FB-304-30	29¾	32 1/16	28
DBT*-FB-304-32	31¾	34 1/16	28
DBT*-FB-304-34	33¾	36 1/16	32
DBT*-FB-304-36	35¾	38 1/16	32

**Type of Actuator.*

Note: *Dimensions shown are AAF Flanders standard.*
AAF Flanders can manufacture dampers to custom fit any existing ductwork.
Static pressure through open dampers is negligible with reasonable velocities.





AstroSafe KF-Series Gel Seal Non-Bag-In/Bag-Out Housings

Product Overview

- High efficiency filtration, side servicing filter housing
- Designed to give user maximum quality and performance in a non-bag-in/bag-out configuration
- Guaranteed to pass DOP and Freon in-place tests

KF1 - 1H 2W - 2 GGF - 304 - D1

Housing Series
KF1 = Non-Bag-Out Type for Gasket Seal Filters

Number of Filters High

Number of Filters Wide

Size Designator of Primary Filter
(see chart below)

Nominal Depth of Prefilter
2 = 2 inch deep Prefilter
4 = 4 inch deep Prefilter
6 = 6 inch deep Prefilter
Blank = No Prefilter

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

Access Door Arrangement
D1 = One Access Door
D2 = Two Access Doors, One per Side
D3 = Two Access Doors on One Side (one for primary filter, one for prefilter)
D4 = Four Access Doors, Two on Each Side (one for primary filter, one for prefilter)

Product Information

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
KF1-1H1W-2/4/6CC-304-D1*	18	15	14	50
KF1-1H1W-2/4/6CG-304-D1*	18	27	14	60
KF1-1H1W-2/4/6GC-304-D1*	30	15	14	70
KF1-1H1W-2/4/6GG-304-D1*	30	27	14	80
KF1-1H2W-GGF/12-304-D1	30	51	25	200
KF1-1H2W-GG16-304-D1	30	51	32⅝	220
KF1-1H2W-GG18-304-D1	30	51	32⅝	225
KF1-1H2W-2/4/6GGF/12-304-D1	30	51	33¼	255
KF1-1H2W-2/4/6GG16-304-D1	30	51	41	275
KF1-1H2W-2/4/6GG18-304-D1	30	51	41	285
KF1-1H2W-2/4/6GGF/12-304-D3	30	51	37½	275
KF1-1H2W-2/4/6GG16-304-D3	30	51	45¼	295
KF1-1H2W-2/4/6GG18-304-D3	30	51	45¼	305
KF1-1H2W-2/4/6GG-304-D1*	30	51	14	100
KF1-1H3W-GGF/12-304-D1	30	75	25	265
KF1-1H3W-GG16-304-D1	30	75	32⅝	290
KF1-1H3W-GG18-304-D1	30	75	32⅝	300
KF1-1H3W-2/4/6GGF/12-304-D1	30	75	33¼	325
KF1-1H3W-2/4/6GG16-304-D1	30	75	41	350
KF1-1H3W-2/4/6GG18-304-D1	30	75	41	365
KF1-1H3W-2/4/6GG/12-304-D3	30	75	37½	360
KF1-1H3W-2/4/6GG16-304-D3	30	75	45¼	385
KF1-1H3W-2/4/6GG18-304-D3	30	75	45¼	395
KF1-1H3W-2/4/6GG-304-D1*	30	75	14	120

**These housings are designed to accommodate prefilters only.*

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
KF1-1H1W-CCD/6-304-D1**	18	15	19⅜	60
KF1-1H1W-CCF/12-304-D1	18	15	25	75
KF1-1H1W-CGF/12-304-D1	18	27	25	100
KF1-1H1W-CG16-304-D1	18	27	32⅝	110
KF1-1H1W-GCF/12-304-D1	30	15	25	105
KF1-1H1W-GC16-304-D1	30	15	32⅝	115
KF1-1H1W-GGF/12-304-D1***	30	27	25	135
KF1-1H1W-GG16-304-D1	30	27	32⅝	150
KF1-1H1W-GG18-304-D1	30	27	32⅝	155
KF1-1H1W-2/4/6CCF/12-304-D1	18	15	33¼	105
KF1-1H1W-2/4/6CGF/12-304-D1	18	27	33¼	140
KF1-1H1W-2/4/6CG16-304-D1	18	27	41	150
KF1-1H1W-2/4/6GCF/12-304-D1	30	15	33¼	140
KF1-1H1W-2/4/6GC16-304-D1	30	15	41	155
KF1-1H1W-2/4/6GGF/12-304-D1	30	27	33¼	175
KF1-1H1W-2/4/6GG16-304-D1	30	27	41	195
KF1-1H1W-2/4/6GG18-304-D1	30	27	41	200
KF1-1H1W-2/4/6CCF/12-304-D3	18	15	37½	110
KF1-1H1W-2/4/6CGF/12-304-D3	18	27	37½	150
KF1-1H1W-2/4/6CG16-304-D3	18	27	45¼	165
KF1-1H1W-2/4/6GCF/12-304-D3	30	15	37½	150
KF1-1H1W-2/4/6GC16-304-D3	30	15	45¼	265
KF1-1H1W-2/4/6GGF/12-304-D3	30	27	37½	190
KF1-1H1W-2/4/6GG16-304-D3	30	27	45¼	205
KF1-1H1W-2/4/6GG18-304-D3	30	27	45¼	210

***The D/6 in this model number represents the following model numbers:*
KF1-1H1W-CCD-304-D1 *to contain a HEPA filter*
KF1-1H1W-CC6-304-D1 *to contain a Carbon Adsorber*

****The F/12 in this model number represents the following model numbers:*
KF1-1H1W-GGF-304-D1 *to contain a HEPA filter*
KF1-1H1W-GG12-304-D1 *to contain a Carbon Adsorber*

Note: *For multi-high housings, just add the height dimension as needed.*

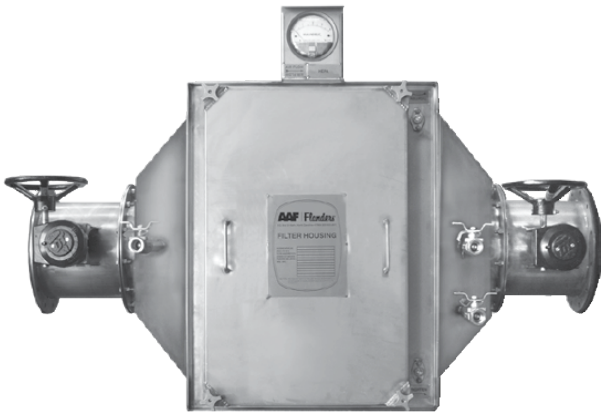
Filter Size Designator (HEPA Filters and Carbon Adsorbers) **Actual Filter Dimensions are Listed**
HEPA Filters
†CCD 12 x 12 x 5⅞
†CCF 12 x 12 x 11½
†CGF 12 x 24 x 11½
†GCF 24 x 12 x 11½
†GGF 24 x 24 x 11½
Carbon Adsorbers
†CC6 12 x 12 x 5⅞
†CC12 12 x 12 x 11½
†CG12 12 x 24 x 11½
†GC12 24 x 12 x 11½
†GG12 24 x 24 x 11½
†CG16 12 x 24 x 16
†GC16 24 x 12 x 16
†GG16 24 x 24 x 16
†GG18 24 x 24 x 18

†Insert 2, 4, or 6 to indicate 2", 4", or 6" prefilter track.

AstroSafe KG-Series Gasket Seal Non-Bag-In/Bag-Out Housings

Product Overview

- High efficiency side servicing filter housing
- Non-bag-in/bag-out configuration
- Designed for gasket seal primary filters



KG1 - 1H 2W - 2 GGF - 304 - D1

Housing Series
KF1 = Non-Bag-Out Type for Gasket Seal Filters

Number of Filters High

Number of Filters Wide

Nominal Depth of Prefilter
2 = 2 inch deep Prefilter
4 = 4 inch deep Prefilter
6 = 6 inch deep Prefilter
Blank = No Prefilter

Size Designator of Primary Filter
(see chart below)

Housing Material Type
304 = Type 304 Stainless Steel (Standard)
304L = Type 304L Stainless Steel
316 = Type 316 Stainless Steel
316L = Type 316L Stainless Steel

Access Door Arrangement
D1 = One Access Door
D2 = Two Access Doors, One per Side
D3 = Two Access Doors on One Side (one for primary filter, one for prefilter)
D4 = Four Access Doors, Two on Each Side (one for primary filter, one for prefilter)

Product Information

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
KG1-1H1W-2/4/6CC-304-D1*	18	15	14	50
KG1-1H1W-2/4/6CG-304-D1*	18	27	14	60
KG1-1H1W-2/4/6GC-304-D1*	30	15	14	70
KG1-1H1W-2/4/6GG-304-D1*	30	27	14	80
KG1-1H2W-GGF/12-304-D1	30	51	23	200
KG1-1H2W-GG16-304-D1	30	51	27½	220
KG1-1H2W-GG18-304-D1	30	51	29½	225
KG1-1H2W-2/4/6GGF/12-304-D1	30	51	31	255
KG1-1H2W-2/4/6GG16-304-D1	30	51	35½	275
KG1-1H2W-2/4/6GG18-304-D1	30	51	37½	285
KG1-1H2W-2/4/6GGF/12-304-D3	30	51	36¼	275
KG1-1H2W-2/4/6GG16-304-D3	30	51	40¾	295
KG1-1H2W-2/4/6GG18-304-D3	30	51	42¾	305
KG1-1H2W-2/4/6GG-304-D1*	30	51	14	100
KG1-1H3W-GGF/12-304-D1	30	75	23	265
KG1-1H3W-GG16-304-D1	30	75	27½	290
KG1-1H3W-GG18-304-D1	30	75	29½	300
KG1-1H3W-2/4/6GGF/12-304-D1	30	75	31	325
KG1-1H3W-2/4/6GG16-304-D1	30	75	35½	350
KG1-1H3W-2/4/6GG18-304-D1	30	75	37½	365
KG1-1H3W-2/4/6GG/12-304-D3	30	75	36½	360
KG1-1H3W-2/4/6GG16-304-D3	30	75	40¾	385
KG1-1H3W-2/4/6GG18-304-D3	30	75	42¾	395
KG1-1H3W-2/4/6GG-304-D1*	30	75	14	120

**These housings are designed to accommodate prefilters only.*

Part Number	Height (in.)	Width (in.)	Depth (in.)	Weight (Lbs.)
KG1-1H1W-CCD/6-304-D1**	18	15	17⅜	60
KG1-1H1W-CCF/12-304-D1	18	15	23	75
KG1-1H1W-CGF/12-304-D1	18	27	23	100
KG1-1H1W-CG16-304-D1	18	27	27½	110
KG1-1H1W-GCF/12-304-D1	30	15	23	105
KG1-1H1W-GC16-304-D1	30	15	27½	115
KG1-1H1W-GGF/12-304-D1***	30	27	23	135
KG1-1H1W-GG16-304-D1	30	27	27½	150
KG1-1H1W-GG18-304-D1	30	27	29½	155
KG1-1H1W-2/4/6CCF/12-304-D1	18	15	31	105
KG1-1H1W-2/4/6CGF/12-304-D1	18	27	31	140
KG1-1H1W-2/4/6CG16-304-D1	18	27	35½	150
KG1-1H1W-2/4/6GCF/12-304-D1	30	15	31	140
KG1-1H1W-2/4/6GC16-304-D1	30	15	35½	155
KG1-1H1W-2/4/6GGF/12-304-D1	30	27	31	175
KG1-1H1W-2/4/6GG16-304-D1	30	27	35½	195
KG1-1H1W-2/4/6GG18-304-D1	30	27	37½	200
KG1-1H1W-2/4/6CCF/12-304-D3	18	15	36¼	110
KG1-1H1W-2/4/6CGF/12-304-D3	18	27	36¼	150
KG1-1H1W-2/4/6CG16-304-D3	18	27	40¾	165
KG1-1H1W-2/4/6GCF/12-304-D3	30	15	36¼	150
KG1-1H1W-2/4/6GC16-304-D3	30	15	40¾	265
KG1-1H1W-2/4/6GGF/12-304-D3	30	27	36¼	190
KG1-1H1W-2/4/6GG16-304-D3	30	27	40¾	205
KG1-1H1W-2/4/6GG18-304-D3	30	27	42¾	210

***The D/6 in this model number represents the following model numbers:*
KG1-1H1W-CCD-304-D1 *to contain a HEPA filter*
KG1-1H1W-CC6-304-D1 *to contain a Carbon Adsorber*

****The F/12 in this model number represents the following model numbers:*
KG1-1H1W-GGF-304-D1 *to contain a HEPA filter*
KG1-1H1W-GG12-304-D1 *to contain a Carbon Adsorber*

Note: *For multi-high housings, just add the height dimension as needed.*

Filter Size Designator (HEPA Filters and Carbon Adsorbers) **Actual Filter Dimensions are Listed**
HEPA Filters
†CCD 12 x 12 x 5⅞
†CCF 12 x 12 x 11½
†CGF 12 x 24 x 11½
†GCF 24 x 12 x 11½
†GGF 24 x 24 x 11½
Carbon Adsorbers
†CC6 12 x 12 x 5⅞
†CC12 12 x 12 x 11½
†CG12 12 x 24 x 11½
†GC12 24 x 12 x 11½
†GG12 24 x 24 x 11½
†CG16 12 x 24 x 16
†GC16 24 x 12 x 16
†GG16 24 x 24 x 16
†GG18 24 x 24 x 18

†Insert 2, 4, or 6 to indicate 2″, 4″, or 6″ prefilter track.

RPT - Safe Change Housing

Product Overview

- Compact, modular design
- Fully enclosing bag system for safe filter change
- Suitable for both veritcal and horizontal airflow
- Adjustable clamping mechanism for positive air tight sealing
- Space saving design
- Single and double filtration stage available

Specification

Housing Material (Standard)	Galvanised Steel with Epoxy Coating
Housing Material (Optional)	Stainless Steel
Prefilter Stage	Optional
Initial Resistance	250 Pa
Recommended Final Resistance	500, 750 Pa

Accessories

Part Number	Description
T999-3218-010	Prefilter bag & ring
T999-3212-009	HEPA bag & ring

Product Information

Part Number	Dimension mm (W x H x D)	Rated Airflow (CMH)			Filter Quantity
		BioCel® I	AstroCel® I	AstroCel® I HC	
MRPT-11-N-1-N-N	710 x 555 x 710	3,400	1,700	3,400	1
MRPT-21-N-1-N-C	1420 x 555 x 710	6,800	3,400	6,800	2
MRPT-31-N-1-N-C	2130 x 555 x 710	10,200	5,100	10,200	3
MRPT-41-N-1-N-C	2840 x 555 x 710	13,600	6,800	13,600	4
MRPT-51-N-1-N-C	3550 x 555 x 710	17,000	8,500	17,000	5
MRPT-12-N-1-N-C	710 x 555 x 1420	6,800	3,400	6,800	2
MRPT-22-N-1-N-C	1420 x 555 x 1420	13,600	6,800	13,600	4
MRPT-32-N-1-N-C	2130 x 555 x 1420	20,400	10,200	20,400	6
MRPT-42-N-1-N-C	2840 x 555 x 1420	27,200	13,600	27,200	8
MRPT-52-N-1-N-C	3550 x 555 x 1420	34,000	17,000	34,000	10

Part Number:
MRPT-12-P-1-N-C
1 = Number adjacent filter housing (1 to 5)
2 = Single / double row (1 or 2)
P = Prefilter / No prefilter section (P or N)
1 = Number of main filter in air flow direction (1 to 5)
N = Standard
C = Coupling set / No coupling set (C or N)

Example:
MRPT-12-P-1-N-C
12 = Single filter housing with double row
P = There is prefilter section
1 = Single main filter in air flow direction
N = standard
C = Coupling set included

Air Filter Technology

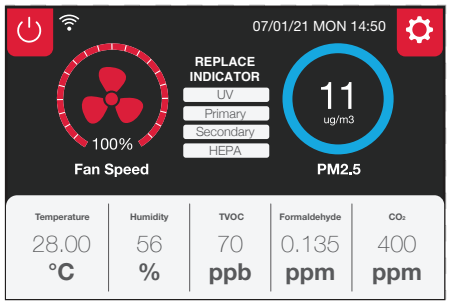
AstroPlus Control Pro

Product Overview

- Seamless integration with AstroPure air purification series
- Wifi-enabled for remote and real-time monitoring
- Filter replacement indication for 3 individual filters
- Design with illuminated, colour-coded display for Air Quality Indication
- Touch-sensitive IPS Display
- Built-in Air Quality Sensors
  - PM1, PM2.5 and PM10 Sensors
  - TVOC Sensor
  - Formaldehyde Sensor
  - CO_2 Sensor
  - Temperature Sensor
  - Relative Humidity Sensor
- Full range of advanced controlling features
  - Device Scheduling
  - UV Light Control
  - 20 Step Fan Speed
  - UV Replacement Indicator
  - Safety Precaution Indicator

Device Specification

Housing Material	ABS Plastic
Interface Size	3.5” IPS Display
Interface Type	LCD
Power Supply	220-240 VAC, 50/60 Hz
Connectivity	Wi-Fi 802.11 B/G/N20 @ 2.4GHz



*Actual user Interface of the AstroPlus Control Pro.
**PM2.5 & PM10 value reference to EPA guidelines.
***TVOC value reference to WHO guidelines.

AIR FILTER TECHNOLOGY

Device Information

Model	Actual Unit Size mm (W x D x H)	Current (A)	Weight (kg)
AstroPlus Control Pro	152 x 40 x 107	2	0.285

*Compatible with all AstroPure air purifiers and Cyclone except for AstroPure 550C & AstroPure PT300A.

AstroPlus Sense

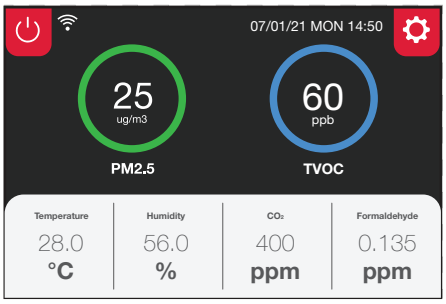
Product Overview

- Wifi-enabled for remote and real-time monitoring
- Design with illuminated, colour-coded display for Air Quality Indication
- Air Quality Sensors
  - PM1, PM2.5 and PM10 Sensors
  - TVOC Sensor
  - Formaldehyde Sensor
  - CO_2 Sensor
  - Temperature Sensor
  - Relative Humidity Sensor

Device Specification

Housing Material	ABS Plastic
Interface Size	3.5” IPS Display
Interface Type	LCD
Power Supply	220-240 VAC, 50/60 Hz
Connectivity	Wi-Fi 802.11 B/G/N20 @ 2.4GHz

**USB type-C cable included.*
***5V 2A adapter not included.*



**Actual User Interface of the AstroPlus Sense.*

Device Information

Part Number	Model	Actual Unit Size mm (W x D x H)	Packing Dimension mm (W x D x H)	Current (A)	Weight (kg)
M951-930-206	AstroPlus Sense	152 x 40 x 107	200 x 58 x 145	2	0.285

Sensor360

Product Overview

- Real time Particulate Matter and filter resistance monitoring
- Filter lifetime prediction
- High level alert function

Specification

Gateway	
Cellular	GSM 850/900/1800/1900
	UMTS 800/850/900/2100
Input Power	5.5 VDC @ 900 mA
IM Card Compatibility	Mini-SIM

DP Sensor	
Wireless Operation	433 MHz
Wireless Range	300 meters
Input Power	3.8 VDC
Pressure Range	-500 to +500 Pa

PM Sensor	
Wireless Operation	433 MHz
Wireless Range	300 meters
Input Power	3.8 VDC
PM Range	PM1, PM2.5 and PM10

Product Information

Part Number	Type	Model	Size mm (W x H x D)	Battery	Operating Temperature (°C)
T916-400-228	Cellular Gateway	AFG-4CG-3GI	96 x 127 x 38	Lithium Polymer	-10 to +45
T916-400-231	DP Sensor	AFS-4AA-DP	53 x 98 x 38	Alkaline AA Batteries	-18 to +55
T916-400-232	Indoor PM Sensor	AFS-4AA-P25	57 x 124 x 38		

Air Filter Frames

Universal Holding Frames

Product Overview

- Designed to exclusively work with the Universal Holding Frame retaining tab
- Latches available for a variety of filters, filter depths and combination of filters
- Galvanised steel to withstand harsh environments
- Double latches allow prefilters to be changed without disturbing the final filter

Specification

Material	Galvanised Steel
Special Size Available	Yes

Product Information

Part Number	Nominal Size Inches (W x H x D)	ActualSize mm (W x H x D)	Filter Actual Size mm (W x H)
T012/40017/012	16 x 20 x 3	406 x 508 x 75	391 x 492
T012/40017/009	20 x 20 x 3	508 x 508 x 75	492 x 492
T012/40017/005	12 x 24 x 3	305 x 610 x 75	289 x 594
T012/40017/008	20 x 24 x 3	508 x 610 x 75	492 x 594
T012/40017/003	24 x 24 x 3	610 x 610 x 75	594 x 594
T012/40017/023	16 x 25 x 3	406 x 635 x 75	391 x 619
T012/40017/022	20 x 25 x 3	508 x 635 x 75	492 x 619

Universal Holding Frames Latches

Product Overview

- Designed to exclusively work with the Universal Holding Frame retaining tab
- Latches available for a varity of filters, filter depths and combinations of filters
- Galvanised steel to withstand harsh environments
- Double latches allow prefilters to be changed without disturbing the final filter

Specification

Material	Chromed Steel
Special Size Available	No

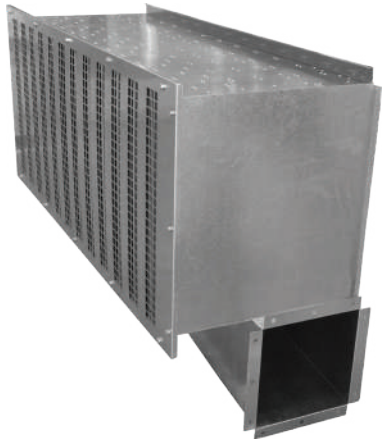
Product Information

Part Number	Latches Model Number	Application
Single Latches		
T020-09002-010	L-10	Holds single header filter or 1" filter in AAF Universal Holding Frames (UHF)
T020-09002-020	L-20	Holds 2" thick filter or holds single header filter with a 1" prefilter in AAF UHF
T020-09002-030	L-30	Holds single header filter with a 2" prefilter in AAF UHF
T020-09002-040	L-40	Holds two 2" or one 4" deep filter in AAF UHF
T020-09002-050	L-50	Holds single header filter with a 4" prefilter in AAF UHF
Double Latches		
T020-09002-042	L-42	Holds 4" filter with a 2" prefilter in AAF UHF
T020-09002-044	L-44	Holds 4" filter with a 4" prefilter in AAF UHF
Spring Type		
T020-09002-002	SL-12	Holds 12" double header filter in AAF UHF
T020-09012-002	SL-12 VP-2	Holds 12" double header filter with a 2" prefilter in AAF UHF
T020-09012-003	SL-12 VP-4	Holds 12" double header filter with a 4" prefilter in AAF UHF

S-Trap L

Product Overview

- Industry leading capacity
- High filtration performance at lower pressure drop
- Compact, lightweight
- Self-cleaning
- Hot-dip galvanised steel & riveted
- On-site assembly possible
- Quick & easy removable inlet screen and filtration elements



Specification

Number of Filter Element	1-40
Arrestance	92%
Housing Material (Standard)	Galvanised Steel
Housing Material (Optional)	Stainless Steel
Dust Chute	Centre, Left, Right, Both sides
Special Size Available	Yes
Other Optionals	Secondary Fan, Control Panel, Manometer, Weather Hood, Support Legs

Product Information

Part Number	Actual Size mm (H x W x D)	Number of Filter Element	Airflow @ 50 Pa		Airflow @ 250 Pa	
			Clean (CMH)	Secondary (CMH)	Clean (CMH)	Secondary (CMH)
STL 2						
STL-2-4	610 x 651 x 605	4	3,683	405	7,367	810
STL-2-6	610 x 895 x 605	6	5,525	608	11,050	1,216
STL-2-8	610 x 1139 x 605	8	7,367	810	14,733	1,621
STL-2-10	610 x 1383 x 605	10	9,208	1,013	18,417	2,026
STL-2-12	610 x 1627 x 605	12	11,050	1,216	22,100	2,431
STL-2-14	610 x 1871 x 605	14	12,892	1,418	25,783	2,836
STL-2-16	610 x 2115 x 605	16	14,733	1,621	29,467	3,241
STL-2-18	610 x 2359 x 605	18	16,575	1,823	33,150	3,647
STL-2-20	610 x 2603 x 605	20	18,417	2,026	36,833	4,052
STL 4						
STL-4-6	1290 x 895 x 605	6	11,050	1,216	22,100	2,431
STL-4-8	1290 x 1139 x 605	8	14,733	1,621	29,467	3,241
STL-4-10	1290 x 1383 x 605	10	18,417	2,026	36,833	4,052
STL-4-12	1290 x 1627 x 605	12	22,100	2,431	44,200	4,862
STL-4-14	1290 x 1871 x 605	14	25,783	2,836	51,567	5,672
STL-4-16	1290 x 2115 x 605	16	29,467	3,241	58,933	6,483
STL-4-18	1290 x 2359 x 605	18	33,150	3,647	66,300	7,293
STL-4-20	1290 x 2603 x 605	20	36,833	4,052	73,667	8,103

**Housing height excludes dust chute.*

S-Trap HD

Product Overview

- Industry leading capacity
- High filtration performance at lower pressure drop
- Heavy duty welded and painted construction
- Self-cleaning
- Painted mild steel or stainless steel options
- Quick & easy removable inlet screen and filtration elements

Specification

Number of Filter Element	1-40
Arrestance	92%
Housing Material (Standard)	Steel with Polyurethane Coated
Housing Material (Optional)	Stainless Steel
Dust Chute	Centre, Left, Right, Both sides
Special Size Available	Yes
Other Optionals	Secondary Fan, Control Panel, Manometer, Weather Hood, Support Legs

Product Information

Part Number	Actual Size mm (H x W x D)	Number of Filter Element	Airflow @ 50 Pa		Airflow @ 250 Pa	
			Clean (CMH)	Secondary (CMH)	Clean (CMH)	Secondary (CMH)
STHD 2						
STHD-2-4	610 x 651 x 605	4	3,683	405	7,367	810
STHD-2-6	610 x 895 x 605	6	5,525	608	11,050	1,216
STHD-2-8	610 x 1139 x 605	8	7,367	810	14,733	1,621
STHD-2-10	610 x 1383 x 605	10	9,208	1,013	18,417	2,026
STHD-2-12	610 x 1627 x 605	12	11,050	1,216	22,100	2,431
STHD-2-14	610 x 1871 x 605	14	12,892	1,418	25,783	2,836
STHD-2-16	610 x 2115 x 605	16	14,733	1,621	29,467	3,241
STHD-2-18	610 x 2359 x 605	18	16,575	1,823	33,150	3,647
STHD-2-20	610 x 2603 x 605	20	18,417	2,026	36,833	4,052
STHD 4						
STHD-4-6	1290 x 895 x 605	6	11,050	1,216	22,100	2,431
STHD-4-8	1290 x 1139 x 605	8	14,733	1,621	29,467	3,241
STHD-4-10	1290 x 1383 x 605	10	18,417	2,026	36,833	4,052
STHD-4-12	1290 x 1627 x 605	12	22,100	2,431	44,200	4,862
STHD-4-14	1290 x 1871 x 605	14	25,783	2,836	51,567	5,672
STHD-4-16	1290 x 2115 x 605	16	29,467	3,241	58,933	6,483
STHD-4-18	1290 x 2359 x 605	18	33,150	3,647	66,300	7,293
STHD-4-20	1290 x 2603 x 605	20	36,833	4,052	73,667	8,103

**Housing height excludes dust chute.*

Roll-O-Matic

Product Overview

- Heavy-duty, rigidly constructed automatic renewable media filter
- Suitable for all types of air conditioning and ventilating systems
- Easy to install, requires little maintenance
- Supplied with a high quality filter media

Specification

Arrestance	70-85%
Media Type	Fibreglass
Controller (Standard)	Pressure Control
Controller (Optional)	Timer
Power Consumption	220/400V 3phases 50Hz 0.18kW, 220V 1phase 50Hz 0.12kW

Product Information

Part Number	Housing Dimension mm (W x H x D)	Rated Airflow (CMH)
VJ 3-38 PCG	914 x 1117 x 637	6,588
VJ 3-40 PCG	914 x 1219 x 637	7,164
VJ 3-50 PCG	914 x 1524 x 637	9,216
VJ 3-54 PCG	914 x 1626 x 637	9,900
VJ 3-58 PCG	914 x 1727 x 637	10,656
VJ 3-60 PCG	914 x 1829 x 637	11,340
VJ 3-64 PCG	914 x 1930 x 637	12,060
VJ 3-68 PCG	914 x 2032 x 637	12,744
VJ 3-70 PCG	914 x 2134 x 637	13,464
VJ 3-74 PCG	914 x 2235 x 637	14,148
VJ 3-78 PCG	914 x 2337 x 637	14,904
VJ 3-80 PCG	914 x 2438 x 637	15,588
VJ 3-84 PCG	914 x 2540 x 637	16,308
VJ 3-88 PCG	914 x 2642 x 637	16,992
VJ 3-90 PCG	914 x 2743 x 637	17,748
VJ 3-94 PCG	914 x 2845 x 637	18,468
VJ 3-98 PCG	914 x 2947 x 637	19,152
VJ 3-100 PCG	914 x 3048 x 637	19,836
VJ 4-38 PCG	1219 x 1117 x 637	9,000
VJ 4-40 PCG	1219 x 1219 x 637	9,900
VJ 4-50 PCG	1219 x 1524 x 637	12,888
VJ 4-54 PCG	1219 x 1626 x 637	13,896
VJ 4-58 PCG	1219 x 1727 x 637	14,868
VJ 4-60 PCG	1219 x 1829 x 637	15,912
VJ 4-64 PCG	1219 x 1930 x 637	16,884
VJ 4-68 PCG	1219 x 2032 x 637	17,856
VJ 4-70 PCG	1219 x 2134 x 637	18,864
VJ 4-74 PCG	1219 x 2235 x 637	19,836
VJ 4-78 PCG	1219 x 2337 x 637	20,844
VJ 4-80 PCG	1219 x 2438 x 637	21,852
VJ 4-84 PCG	1219 x 2540 x 637	22,860
VJ 4-88 PCG	1219 x 2642 x 637	23,796
VJ 4-90 PCG	1219 x 2743 x 637	24,804
VJ 4-94 PCG	1219 x 2845 x 637	25,812
VJ 4-98 PCG	1219 x 2947 x 637	26,784
VJ 4-100 PCG	1219 x 3048 x 637	27,792

Part Number	Housing Dimension mm (W x H x D)	Rated Airflow (CMH)
VJ 5-38 PCG	1524 x 1117 x 637	11,700
VJ 5-40 PCG	1524 x 1219 x 637	12,816
VJ 5-50 PCG	1524 x 1524 x 637	16,560
VJ 5-54 PCG	1524 x 1626 x 637	17,856
VJ 5-58 PCG	1524 x 1727 x 637	19,116
VJ 5-60 PCG	1524 x 1829 x 637	20,412
VJ 5-64 PCG	1524 x 1930 x 637	21,708
VJ 5-68 PCG	1524 x 2032 x 637	22,896
VJ 5-70 PCG	1524 x 2134 x 637	24,264
VJ 5-74 PCG	1524 x 2235 x 637	25,488
VJ 5-78 PCG	1524 x 2337 x 637	26,784
VJ 5-80 PCG	1524 x 2438 x 637	28,044
VJ 5-84 PCG	1524 x 2540 x 637	29,304
VJ 5-88 PCG	1524 x 2642 x 637	30,600
VJ 5-90 PCG	1524 x 2743 x 637	31,140
VJ 5-94 PCG	1524 x 2845 x 637	33,156
VJ 5-98 PCG	1524 x 2947 x 637	34,416
VJ 5-100 PCG	1524 x 3048 x 637	35,712
VJ 6-38 PCG	1829 x 1117 x 637	14,184
VJ 6-40 PCG	1829 x 1219 x 637	15,516
VJ 6-50 PCG	1829 x 1524 x 637	20,268
VJ 6-54 PCG	1829 x 1626 x 637	21,852
VJ 6-58 PCG	1829 x 1727 x 637	23,400
VJ 6-60 PCG	1829 x 1829 x 637	24,408
VJ 6-64 PCG	1829 x 1930 x 637	26,460
VJ 6-68 PCG	1829 x 2032 x 637	28,008
VJ 6-70 PCG	1829 x 2134 x 637	29,592
VJ 6-74 PCG	1829 x 2235 x 637	31,212
VJ 6-78 PCG	1829 x 2337 x 637	32,688
VJ 6-80 PCG	1829 x 2438 x 637	34,200
VJ 6-84 PCG	1829 x 2540 x 637	35,784
VJ 6-88 PCG	1829 x 2642 x 637	37,404
VJ 6-90 PCG	1829 x 2743 x 637	38,952
VJ 6-94 PCG	1829 x 2845 x 637	40,536
VJ 6-98 PCG	1829 x 2947 x 637	42,012
VJ 6-100 PCG	1829 x 3048 x 637	43,596

Fresh Air Units & Air Purifiers

AstroCube

Product Overview

- **H14 HEPA S+ Filter with Additional Antivirus & Antimicrobial Protection**
  Removes up to 99.995% of ultra fine particles, including viruses and microbes, with a 99.9% efficacy rate

- **Wi-Fi Smart Control**
  Control your unit anywhere and anytime through our AAF Connect mobile app

- **PM2.5 & CO_2 Display**
  Visualise your current indoor air quality (IAQ) through real-time monitoring

More Features

- Suitable for indoor application to bring in clean fresh air from outdoor
- Reduce indoor CO_2 level
- Optional heat recovery feature to reduce the heat from outdoor and reduce stress - A/C system
- Easy installation & maintenance
- Act as an indoor circulation purifier when fresh air is not needed
- Quick switch operation modes from the LED touch panel

Equipment Specification

Airflow	500 CMH
Fresh Air Inlet	150 mm Collar
Exhaust Air Outlet	100 mm Collar
Return Air Inlet	Perforated
Supply Air Outlet	Linear Air Grille
Controller	AAF Connect App, Touch Panel Display
Housing Material	Powder Coated Steel
Housing Color	White
Power Supply	1ph/50Hz/220~240VAC
Applicable Coverage Area$_1$	56 - 477 m^2
Sound Pressure Level	41 - 51 dBA
Heat Recovery Efficiency	68%

$_1$The coverage area is calculated based on 3m ceiling height and 0.35 - 3 air purification per hour at maximum airflow.

Equipment Information

Part Number	Description	Actual Housing Size mm (H x W x D)	Filter Configuration	Current (A)	Weight (kg)
SB-ACUBE-0001	AstroCube (AstroVee 2V S+ H14)	1920 x 500 x 360	AstroCube G4 + AstroCube F8 + AstroVee 2V S+ H14	1.6	110

**Unit is equipped with filter. Please contact your sales representatives for more information.*

AstroFresh 240W

Product Overview

- **H13 True HEPA Filter**
  Effectively remove up to 99.95% of ultra fine particles
- **Wi-Fi Smart Control**
  Control your unit anywhere and anytime using AAF Connect mobile app
- **CO_2, PM2.5 & TVOC Air Quality Display**
  Real time indoor air quality monitoring
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Fresh air mode brings in fresh air to keep your room fresh and clean
- The recirculation mode help to improve the indoor air quality
- Mixed air mode brings in fresh air into the room while recirculating indoor air to improve the overall indoor air quality
- The auto mode will automatically adjust the performance of the unit based on the air quality picked up by the sensors
- Temperature sensor helps to indicate the current indoor and outdoor room temperature
- Filter change indicator indicates when it is time for filter replacement

Equipment Specification

Airflow	60 / 120 / 180 / 240 CMH
Fresh Air Inlet	110 mm Collar
Return Air Inlet	Side Linear Grille
Supply Air Outlet	Top Linear Grille
Controller	AAF Connect App, Touch Panel with Display, Remote Control
Housing Material	Plastic
Housing Color	Matte White
Filter Configuration	3-in-1 HEPA Composite Filter
Power Supply	1ph/50Hz/220~240VAC
Applicable Coverage Area$_1$	27 - 229 m^2
Sound Pressure Level	35 - 47 dBA
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 0.35 - 3 air purification per hour at maximum airflow.

Equipment Information

Part Number	Model	Actual Size mm (W x H x D)	Current (A)	Weight (kg)
M24W1-003C10-111111	AstroFresh 240W	500 x 190 x 400	0.3	7.5
M24W1-003C10-111000	AstroFresh 240W/WR			

**Unit is equipped with filter. Please contact your sales representatives for more information.*

AstroPure 550C

Product Overview

- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Wi-Fi Smart Control**
  Control your unit anywhere and anytime through our AAF Connect mobile app
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms
- **PM & TVOC Display**
  Visualise your current indoor air quality (IAQ) through real-time monitoring

More Features

- Aerodynamic Design (3 inlets & 3 outlets)
- Disinfects and diminishes bad smells in the room
- Touch Panel OLED Display
- Easy to operate and Maintenance
- Mobility - 4 x Caster Wheels

Equipment Specification

CADR$_1$	550 - 700 CMH
Air Outlet	3-sides Linear Air Grille
Controller	5 Levels of Speed
Housing Material	HIPS
Housing Color	Matte White
Filter Configuration$_2$	3-in-1 Cylindrical filter (Prefilter + H14 HEPA + Carbon)
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_3$	182 m^2
Sound Pressure Level	24 - 55.9 dBA
UV Wavelength	275 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Model	Actual Unit Size mm (H x W x D)	Packing Dimension mm (H x W x D)	Current (A)	Weight (kg)
MAP-55P1-0041-1011	AstroPure 550C	667 x 370 x 370	745 x 462 x 433	0.33	12

**Unit is equipped with filter. Please contact your sales representatives for more information.*

AstroPure PT300A

Product Overview

- **H13 True HEPA Filter**
  Effectively removes up to 99.95% of ultra fine particles

- **Purification area up to 78 m²**
  An economical unit with huge coverage area

More Features

- Ideal for bundling with a larger AAF's air purification unit to fill up the gap for larger area coverage requirement
- 3-Stage Air Filtration System that comes with Prefilter, H13 True HEPA filter and Carbon filter
- Adjust fan speed according to you needs
- Set operating hours at your convenience
- Near silence operation for better sleep quality when in night mode
- The filter indicator alerts the user when it is time to filter replacement

Equipment Specification

CADR	145 - 300 CMH
Air Outlet	Top Linear Air Grille
Controller	3 Levels of Speed
Housing Material	PVC
Housing Color	Matte White
Filter Configuration	3-in-1 H13 HEPA Composite Filter (Prefilter + Carbon + H13 HEPA)
Power Supply	1ph/50Hz/220~240VAC
Applicable Coverage Area [1]	38 - 78 m²
Sound Pressure Level	31 - 45 dBA

[1] The coverage area calculation is based on CADR of 300CMH according to NRCC-54013 standard.

Equipment Information

Part Number	Model	Actual Unit Size mm (H x W x D)	Packing Dimension mm (H x W x D)	Current (A)	Weight (kg)
MPT30A-1101-003C00	AstroPure PT300A	510 x 346 x 193	575 x 412 x 252	0.30	5.5

**Unit is equipped with filter. Please contact your sales representatives for more information.*

AstroPure VFN700A

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Ideally designed to improve the air quality of the recirculation air by reducing PM2.5, bacteria, and virus
- Designed with the combination of two-stage filtration, supplied as total clean air solutions, removing airborne particulate contaminants
- Designed with variable speed controller to regulate the airflow
- Self-contained system for quick installation (plug and play)
- Easy operation and maintenance
- Superior protection from installed filters and optional UVC lamp
- Conveniently safe IAQ monitoring and control

Equipment Specification	AstroPure VFN700A Pro	AstroPure VFN700A
Airflow	150 - 730 CMH	100 - 680 CMH
Air Outlet	Perforated Air Grille	Perforated Air Grille
Housing Material	Galvanised Steel	Galvanised Steel
Housing Finishing	White Powder Coated	White Powder Coated
Filter Configuration	AmAir 300E G4 + MEGAcel II ePTFE H14	AmAir 300E G4 + MEGAcel II ePTFE H14
Power Supply	1ph/50~60Hz/220~240VAC	1ph/50~60Hz/220~240VAC
Applicable Coverage Area[1]	41- 243 m^2	38 - 227 m^2
Sound Pressure Level	40 - 60 dBA	40 - 60 dBA
UV Wavelength	254 nm	254 nm

[1]The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (H x W x D)	Controller	UV	Current (A)	Weight (kg)
AstroPure VFN700A Pro					
M652-12510D-210CP	840 × 450 × 417	AstroPlus Control	No	1.23	27
M652-12511D-210CP			Yes	1.28	28
M652-12510S-010CP		AstroPlus Control Pro	No	1.32	27
M652-12511S-010CP			Yes	1.34	28
AstroPure VFN700A					
M652-12520D-210CP	840 × 450 × 417	AstroPlus Control	No	1.40	27
M652-12521D-210CP			Yes	1.43	28
M652-12520S-010CP		AstroPlus Control Pro	No	1.41	27
M652-12521S-010CP			Yes	1.45	28

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M140-202-1249	AmAir 300E	396 x 396 x 44	G4	Removes coarse particles
M5751-4213-2971H	MEGAcel II ePTFE	396 x 396 x 50	H14	Removes finer particles and pathogens

AstroPure VFN1200A

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Ideally designed to improve the air quality of the recirculation air by reducing PM2.5, bacteria, and virus
- Designed with the combination of two-stage filtration, supplied as a total clean air solutions, removing airborne particulate contaminants
- Designed with a variable speed controller to regulate the airflow
- Self-contained system for quick installation (plug and play)
- Easy operation and maintenance
- Superior protection is provided by the installed filters and the optional UVC lamp
- Conveniently safe IAQ monitoring and control

Equipment Specification	AstroPure VFN1200A Pro	AstroPure VFN1200A
Airflow	420 - 1,250 CMH	400 - 1,220 CMH
Air Outlet	Perforated Air Grille	Perforated Air Grille
Housing Material	Galvanised Steel	Galvanised Steel
Housing Finishing	White Powder Coated	White Powder Coated
Filter Configuration	Varicel II F7 + MEGAcel III eFRM H14	Varicel II F7 + MEGAcel III eFRM H14
Power Supply	1ph/50~60Hz/220~240VAC	1ph/50~60Hz/220~240VAC
Applicable Coverage Area[1]	69 - 417 m^2	68 - 407 m^2
Sound Pressure Level	40 - 65 dBA	40 - 65 dBA
UV Wavelength	254 nm	254 nm

[1]The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (H x W x D)	Controller	UV	Current (A)	Weight (kg)
AstroPure VFN1200A Pro					
M655-141230D-210CP	1230 × 600 × 605	AstroPlus Control	No	1.18	68
M655-141231D-210CP			Yes	1.22	70
M655-141230S-010CP		AstroPlus Control Pro	No	1.24	68
M655-141231S-010CP			Yes	1.28	70
AstroPure VFN1200A					
M655-141240D-210CP	1230 × 600 × 605	AstroPlus Control	No	1.46	68
M655-141241D-210CP			Yes	1.52	70
M655-141240S-010CP		AstroPlus Control Pro	No	1.50	68
M655-141241S-010CP			Yes	1.56	70

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M332-410-0163	VariCel II 80 - 85%	492 x 584 x 95	F7	Removes fine particles
M451-101-3423L	MEGAcel III eFRM	510 x 585 x 292	H14	Removes finer particles and pathogens

AstroPure 1700V

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Suitable for indoors requiring negative pressure
- Ideally designed to improve the air quality of the recirculation air by reducing PM2.5, bacteria, and virus
- Designed with the combination of two-stage filtration, supplied as total clean air solutions, removing airborne particulate contaminants
- Designed with insulated double-wall, incorporated with low noise design
- Self-contained system for quick installation (plug and play)
- Easy operation and maintenance
- Superior protection from installed filters and optional UVC lamp
- Conveniently safe IAQ monitoring and control

Equipment Specification

Airflow	400 - 2,300 CMH
Air Outlet	350 mm Collar
Controller	AstroPlus Control, AstroPlus Control Pro
Housing Material	Double Wall Panel Construction
Housing Finishing	White Powder Coated
Filter Configuration	VariCel II F7 + MEGAcel III H14
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_1$	87 - 174 m^2
Sound Pressure Level	40 - 55 dBA
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (L x W x H)	Controller	UV	Current (A)	Weight (kg)
M4151-14920-D211BP	720 x 827 x 1650	AstroPlus Control	No	1.52	140
M4151-14922-D211BP			Yes	1.60	141
M4151-14920-S311BP		AstroPlus Control Pro	No	1.61	140
M4151-14922-S311BP			Yes	1.69	141

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M332-410-008	VariCel II 80 - 85%	594 x 594 x 95	F7	Removes coarse particles
M451-201-005	MEGAcel III eFRM	610 x 610 x 292	H14	Removes finer particles and pathogens
Alternative				
M182-114-863	AmAir/C	594 x 594 x 95	G4	Removes VOC
M431-201-005	MEGAcel III ePTFE	610 x 610 x 292	H14	Removes finer particles and pathogens
M571-201-005	AstroCel III			Removes finer particles and pathogens

**Customised unit available upon request. Please contact your sales representative for more information.*

AstroPure 2100VF

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Ideally designed to improve the air quality of the recirculation air by reducing PM2.5, bacteria, and virus
- Designed with the combination of two-stage filtration, supplied as total clean air solutions, removing airborne particulate contaminants
- Designed with variable speed controller to regulate the airflow
- Designed with insulated double-wall, incorporated with low noise design
- Self-contained system for quick installation (plug and play)
- Easy operation and maintenance
- Superior protection from installed filters and optional UVC lamp

Equipment Specification

Airflow	750 - 2,100 CMH
Air Outlet	Linear Air Grille
Controller	Triac
Housing Material	Double Wall Panel Construction
Housing Finishing	White Powder Coated
Filter Configuration	VariCel II F7 + MEGAcel III eFRM H14
Power Supply	1ph/50~60Hz/230VAC
Applicable Coverage Area$_1$	117 - 700 m^2
Sound Pressure Level	42 - 54 dBA
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Model	Actual Housing Size mm (H x W x D)	Current (A)	Weight (kg)
M6502-3044-302H	AstroPure 2100VF	1650 x 827 x 720	1.85	138
M6502-3044-322H	AstroPure 2100VF UV		1.94	140

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M332-410-008	VariCel II 80 - 85%	594 x 594 x 95	F7	Removes fine particles
M451-201-005	MEGAcel III eFRM	610 x 610 x 292	H14	Removes finer particles and pathogens
Alternative				
M182-114-863	AmAir/C	594 x 594 x 95	G4	Removes VOC
M431-201-005	MEGAcel III ePTFE	610 x 610 x 292	H14	Removes finer particles and pathogens
M571-201-005	AstroCel III			

**Customised unit available upon request. Please contact your sales representative for more information.*

Cyclone

Product Overview

- **H13 True HEPA Filter**
  Effectively removes up to 99.99% of fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms
- **Wi-Fi Smart Control**
  IoT smart air filtration with illuminated, colour-coded display for air quality indication

More Features

- Cleans and recirculates purified air
- Removes air pollutants
- Reduces the risk from virus and bacteria
- Conveniently safe IAQ monitoring and control

Equipment Specification

Airflow	1,700 CMH
Air Outlet	3-sides Linear Air Grille
Controller	AstroPlus Control Pro
Housing Material	Double Wall PU Panel Construction
Housing Finishing	White Epoxy Powder Coated
Filter Configuration	AmAir 300E G4 + VariCel II F8 + AmAir/C+SAAFOxi + AstroCel VXL H13
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_1$	94 - 567 m^2
Sound Pressure Level	< 60 dBA
Connectivity	802.11 B/G/N20 @ 2.4GHz
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 0.35 - 3 air purification per hour at maximum airflow.

Equipment Information

Part Number	Model	Actual Housing Size mm (H x W x D)	Frequency / Voltage (Hz/VAC)	Current (A)	Weight (kg)
M4031-E22Z-21000S	Cyclone 1000VS H	1752 x 830 x 660	50/230	1.25	156
M4031-E22Z-21200S	Cyclone 1000VS HUV			1.39	
M4031-E210-22000S	Cyclone 1000VS GP			1.25	186
M4031-E210-22200S	Cyclone 1000VS GPUV			1.39	

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
Cyclone 1000VS H / UV - Standard				
M140-202-863	AmAir 300E	594 x 594 x 44	G4	Removes coarse particles
M332-428-008	VariCel II 90-95%	594 x 594 x 95	F8	Removes fine particles
M182-102-863	AmAir/C+SAAFOxi	594 x 594 x 44	G4	Removes VOC and corrosive gases
M336-040-001	AstroCel VXL	592 x 592 x 292	H13	Removes finer particles and pathogens
Cyclone 1000VS H / UV - Alternative				
M182-112-863	AmAir/C	594 x 594 x 44	G4	Removes VOC
M336-043-001	AstroCel VXL	592 x 592 x 292	H14	Removes finer particles and pathogens
Cyclone 1000 VS GP / UV - Standard				
M140-202-863	AmAir 300E	594 x 594 x 44	G4	Removes coarse particles
M332-428-608	VariCel II 90-95%		F8	Removes fine particles
M400-012-002	SAAF Cassette HD (SAAFCarb)	295 x 295 x 295	-	Removes VOC
M332-428-008	VariCel II 90-95%	594 x 594 x 95	F8	Removes fine particles

**Unit is equipped with filter. Please contact your sales representative for more information.*

AstroPure CC400A

Product Overview

- **Leak-free Design**
  Maximize air purification
- **H13 HEPA Filter**
  Effectively removes up to 99.95% of ultra-fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Suitable for indoor application to bring in clean fresh air from outdoor
- Ideal ceiling-hanging unit for recirculation of indoor air
- Four built-in hanging brackets at the side housing for ease of installation
- Terminal box allocated at the side of the housing for easy connection
- Simple to install and easy to operate

Equipment Specification

Airflow	225 - 400 CMH
Airflow at External Static Pressure	375 CMH @ 30 Pa, 350 CMH @ 80 Pa, 340 CMH @ 100 Pa
Air Outlet/Inlet	150 mm Connection Duct
Controller	3 Step Fan Speed
Housing Material	Cold Rolled Steel
Housing Finishing	Black Powder Coated
Filter Configuration	Prefilter G4 + H13 HEPA
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area[1]	22 - 133 m^2
Sound Pressure Level	29 - 36 dBA
UV Wavelength	254 nm

[1] *The coverage area is calculated based on 3m ceiling height and1-6 air purification per hour at maximum airflow.*

Equipment Information

Part Number	Model	Actual Unit Size mm (L x W x H)	Current (A)	Weight (kg)
TPC40A-10U20400	AstroPure CC400A	650 x 435 x 220	0.48	13.5

**Unit does not come with power cord. Controller's wire connected to the device by default.*
***Unit is equipped with filter. Please contact your sales representative for more information.*

AstroPure 600N

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Designed to install with stages of high-performance filters that can efficiently reduce fine particles, bacteria, and virus
- Safe and toolless filter replacements
- The filters provided provide superior protection against respiratory droplets
- Four built-in hanging brackets at the side housing for ease of installation
- PVC terminal box allocated at the side of the housing for easy connection
- Conveniently safe IAQ monitoring and control

Equipment Specification	AstroPure 600N Pro	AstroPure 600N
Airflow	80 - 670 CMH	50 - 630 CMH
Airflow at External Static Pressure	600 CMH @ 50 Pa, 585 CMH @ 75 Pa, 570 CMH @ 100 Pa	580 CMH @ 50 Pa, 565 CMH @ 75 Pa, 550 CMH @ 100 Pa
Air Outlet	245 mm Collar	245 mm Collar
Housing Material	Galvanised Steel	Galvanised Steel
Housing Finishing	White Powder Coated	White Powder Coated
Filter Configuration	AmAir 300E G4 + MEGAcel II ePTFE H14	AmAir 300E G4 + MEGAcel II ePTFE H14
Power Supply	1ph/50~60Hz/220~240VAC	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_1$	37 - 223 m^2	35 - 210 m^2
Sound Pressure Level	35 - 59 dBA	35 - 59 dBA
UV Wavelength	254 nm	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (L x W x H)	Controller	UV	Current (A)	Weight (kg)
AstroPure 600N Pro					
M6611-22610-D200P	1000 x 325 x 340	AstroPlus Control	No	1.17	19
M6611-22611-D200P			Yes	1.20	21
M6611-22610-S000P		AstroPlus Control Pro	No	1.23	19
M6611-22611-S000P			Yes	1.26	21
AstroPure 600N					
M6611-22620-D200P	1000 x 325 x 340	AstroPlus Control	No	1.39	19
M6611-22621-D200P			Yes	1.43	21
M6611-22620-S000P		AstroPlus Control Pro	No	1.45	19
M6611-22621-S000P			Yes	1.49	21

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M140-202-764	AmAir 300E	296 x 296 x 44	G4	Removes coarse particles
M5752-7220-2040H	MEGAcel II ePTFE	296 x 296 x 69	H14	Removes finer particles and pathogens
Alternative				
M182-112-764	AmAir C	296 x 296 x 44	G4	Removes VOC and particles
M143-302-764	MEGApleat M13		F7	Removes fine particles

AstroPure 850

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms

More Features

- Designed to install with stages of high-performance filters that can efficiently reduce fine particles, bacteria, and virus
- Safe and toolless filter replacements
- The filters provided provide superior protection against respiratory droplets
- Four built-in hanging brackets at the side housing for ease of installation
- PVC terminal box allocated at the side of the housing for easy connection
- Conveniently safe IAQ monitoring and control

Equipment Specification

Airflow	115 - 1,000 CMH
Airflow at External Static Pressure	950 CMH @ 50 Pa, 925 CMH @ 75 Pa, 900 CMH @ 100 Pa
Air Outlet	245 mm Collar
Housing Material	Galvanised Steel
Housing Finishing	White Powder Coated
Filter Configuration	Varicel II F7 + MEGAcel III eFRM H14
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_1$	55 - 333 m^2
Sound Pressure Level	30 - 53 dBA
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (L x W x H)	Controller	UV	Current (A)	Weight (kg)
M6111-041210-D200P	1250 × 525 × 440	AstroPlus Control	No	1.43	52
M6111-041211-D200P			Yes	1.47	53
M6111-041210-S200P		AstroPlus Control Pro	No	1.49	52
M6111-041211-S200P			Yes	1.53	53

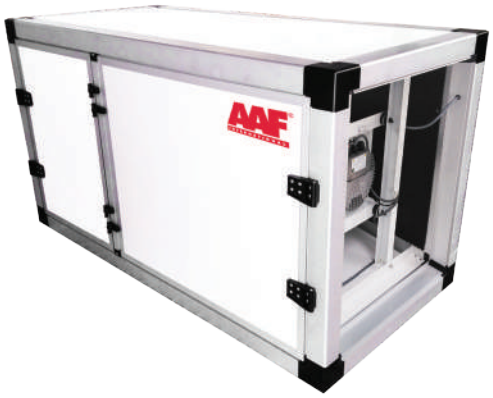
Filter Information

Part Number	Model	Actual Size mm (H x W x D)	Filter Class	Purpose
M332-410-070	VariCel II 80 - 85%	396 x 496 x 95	F7	Removes coarse and fine particles
M451-202-3343	MEGACel III eFRM	396 x 496 x 292	H14	Removes finer particles and pathogens
Alternative				
M571-202-3343	AstroCel III	396 x 496 x 292	H14	Removes finer particles and pathogens

AstroPure 1700 / 3400

Product Overview

- **100% individually leak-free tested**
- **H14 True HEPA Filter**
  Effectively removes up to 99.995% of ultra fine particles
- **Ultraviolet Germicidal Irradiation (UVGI)**
  UVGI is the use of UVC energy to inactivate viral, bacterial, and fungal organisms



More Features

- Designed to equip with 3 stages of high-performance filters which can effectively remove harmful pollutants
- Equipped with safety limit switch to protect the operators
- Constructed with insulated wall panel for better noise reduction and prevention of condensation
- Safe and easy to maintain
- Model equipped with UVC lamp available
- Conveniently safe IAQ monitoring and control

Equipment Specification

Airflow	1,700, 3,400 CMH
Air Outlet (H x W)	727 x 614 mm
Controller	AstroPlus Control, AstroPlus Control Pro
Housing Material	Double Wall Panel Construction
Housing Finishing	White Powder Coated
Filter Configuration (Standard)	AmAir 300E G4 + Varicel II F7 + MEGAcel eFRM III H14
Filter Configuration (Optional)	AmAir/C, MEGAcel III ePTFE H14, AstroCel III H14
Power Supply	1ph/50~60Hz/220~240VAC
Applicable Coverage Area$_1$	87 - 174, 181 - 317 m^2
Sound Pressure Level	57 - 62 dBA
UV Wavelength	254 nm

$_1$The coverage area is calculated based on 3m ceiling height and 1-6 air purification per hour at maximum airflow.

Equipment Information

Part Number	Actual Size mm (L x W x H	Controller	UV	Current (A)	Weight (kg)
AstroPure 1700					
M6311-24310-D000P	1577 x 771 x 878	AstroPlus Control	No	0.67	117
M6311-24312-D000P			Yes	0.87	118
M6311-24310-S000P		AstroPlus Control Pro	No	0.73	117
M6311-24312-S000P			Yes	0.93	118
AstroPure 3400					
M6211-24310-D000P	1577 x 771 x 878	AstroPlus Control	No	0.47	121
M6211-24312-D000P			Yes	0.67	122
M6211-24310-S000P		AstroPlus Control Pro	No	0.53	121
M6211-24312-S000P			Yes	0.73	122

Filter Information

Part Number	Model	Actual Size mm (W x H x D)	Filter Class	Purpose
M140-202-863	AmAir 300E	594 x 594 x 44	G4	Removes coarse particles
M332-410-008	VariCel II 80 - 85%	594 x 594 x 95	F7	Removes fine particles
M451-205-005	MEGAcel III eFRM	610 x 610 x 292	H14	Removes finer particles and pathogens

**Customised unit available upon request. Please contact your sales representative for more information.*

HT Filters

PREpleat HT HC

Product Overview

- Rated at 260°C
- Ultra-fine high loft microglass media
- Aluminized steel U-channel frame
- Available in 44 mm and 95 mm depths
- MERV 8

Specification

EN779	G4
ASHARE 52.2	MERV 8
Filter Depth (mm)	44, 95
Media Type	Fibreglass
Frame Material	Aluminised Steel
Special Size Available	Yes
Antimicrobial Available	No
Recommended Final Resistance	300 Pa
Max Operating Temperature	260°C
Air Filtration Certificate	UL 900

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
44 mm				
T147-002-319	12 x 24 x 2	290 x 595 x 44	1,700	175
T147-002-863	24 x 24 x 2	595 x 595 x 44	3,400	
95 mm				
T147-004-319	12 x 24 x 4	290 x 595 x 95	1,700	125
T147-004-863	24 x 24 x 4	595 x 595 x 95	3,400	

VariCel I HT-400

Product Overview

- Excellent performance
- Designed for oven and other high temperature application
- 180°C maximum temperature

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material	Galvanised Steel
Separator Style	Aluminium
Sealant	White Silicone
Special Size Available	Yes
Antimicrobial Available	No
Header Type	Single, Double, None Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	180°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11					
M3561-3400-1006	12 x 24 x 6	289 x 594 x 149	Single	850	40
M3561-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3561-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3562-3400-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3562-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3562-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3563-3400-1006	12 x 24 x 6	289 x 594 x 149	None	850	35
M3563-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3563-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3561-5400-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	94
M3561-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3561-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3562-5400-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3562-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3562-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3563-5400-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	80
M3563-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3563-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel I HT-400

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F7 / MERV 13					
M3581-3400-1006	12 x 24 x 6	289 x 594 x 149	Single	850	75
M3581-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3581-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3582-3400-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3582-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3582-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3583-3400-1006	12 x 24 x 6	289 x 594 x 149	None	850	60
M3583-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3583-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3581-5400-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	125
M3581-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3581-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3582-5400-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3582-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3582-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3583-5400-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	115
M3583-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3583-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
F8 / MERV 14					
M3591-3400-1006	12 x 24 x 6	289 x 594 x 149	Single	850	95
M3591-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3591-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3592-3400-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3592-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3592-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3593-3400-1006	12 x 24 x 6	289 x 594 x 149	None	850	75
M3593-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3593-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3591-5400-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	145
M3591-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3591-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3592-5400-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3592-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3592-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3593-5400-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	120
M3593-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3593-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
F9 / MERV 15					
M3501-3400-1006	12 x 24 x 6	289 x 594 x 149	Single	850	135
M3501-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3501-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3502-3400-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3502-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3502-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3503-3400-1006	12 x 24 x 6	289 x 594 x 149	None	850	115
M3503-3400-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3503-3400-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3501-5400-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	173
M3501-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3501-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3502-5400-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3502-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3502-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3503-5400-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	155
M3503-5400-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3503-5400-1004	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel I HT-500

Product Overview

- Excellent performance
- Designed for oven and other high temperature application
- 260°C maximum temperature

Specification

EN779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material	Galvanised Steel
Separator Style	Aluminium
Sealant	Red Silicone
Special Size Available	Yes
Antimicrobial Available	No
Header Type	Single, Double, None Header
Recommended Final Resistance	450 Pa
Max Operating Temperature	260°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11					
M3561-3500-1006	12 x 24 x 6	289 x 594 x 149	Single	850	40
M3561-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3561-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3562-3500-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3562-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3562-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3563-3500-1006	12 x 24 x 6	289 x 594 x 149	None	850	35
M3563-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3563-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3561-5500-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	94
M3561-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3561-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3562-5500-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3562-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3562-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3563-5500-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	80
M3563-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3563-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel I HT-500

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Header Type	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F7 / MERV 13					
M3581-3500-1006	12 x 24 x 6	289 x 594 x 149	Single	850	75
M3581-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3581-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3582-3500-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3582-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3582-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3583-3500-1006	12 x 24 x 6	289 x 594 x 149	None	850	60
M3583-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3583-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3581-5500-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	125
M3581-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3581-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3582-5500-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3582-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3582-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3583-5500-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	115
M3583-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3583-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
F8 / MERV 14					
M3591-3500-1006	12 x 24 x 6	289 x 594 x 149	Single	850	95
M3591-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3591-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3592-3500-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3592-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3592-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3593-3500-1006	12 x 24 x 6	289 x 594 x 149	None	850	75
M3593-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3593-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3591-5500-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	145
M3591-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3591-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3592-5500-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3592-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3592-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3593-5500-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	120
M3593-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3593-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
F9 / MERV 15					
M3501-3500-1006	12 x 24 x 6	289 x 594 x 149	Single	850	135
M3501-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3501-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3502-3500-1006	12 x 24 x 6	289 x 594 x 149	Double	850	
M3502-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3502-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3503-3500-1006	12 x 24 x 6	289 x 594 x 149	None	850	115
M3503-3500-1007	20 x 24 x 6	492 x 594 x 149		1,400	
M3503-3500-1008	24 x 24 x 6	594 x 594 x 149		1,700	
M3501-5500-1009	12 x 24 x 12	289 x 594 x 292	Single	1,700	173
M3501-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3501-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3502-5500-1009	12 x 24 x 12	289 x 594 x 292	Double	1,700	
M3502-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3502-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	
M3503-5500-1009	12 x 24 x 12	289 x 594 x 292	None	1,700	155
M3503-5500-1010	20 x 24 x 12	492 x 594 x 292		2,800	
M3503-5500-1004	24 x 24 x 12	594 x 594 x 292		3,400	

VariCel II HT

Product Overview

- Minipleat with ribbon separator
- Panel filter with aluminium extrustion frame
- Silicone free construction
- 385°C maximum temperature

Specification

EN779	M6 - F8
ASHARE 52.2	MERV 11 - 14
Filter Depth (mm)	55, 78
Media Type	Fibreglass
Frame Material	Aluminium
Separator Style	HT Proseal Tech
Gasket Material	Glass Rope
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	≤ 500 Pa
Max Operating Temperature	385°C
Air Filtration Certificate	UL 900

Product Information

Nominal Size Inches (H x W x D)	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11			
12 x 24 x 2	305 x 610 x 55	300	80
24 x 24 x 2	610 x 610 x 55	600	
12 x 24 x 3	305 x 610 x 78	300	75
24 x 24 x 3	610 x 610 x 78	600	
F7 / MERV 13			
12 x 24 x 2	305 x 610 x 55	300	80
24 x 24 x 2	610 x 610 x 55	600	
12 x 24 x 3	305 x 610 x 78	300	75
24 x 24 x 3	610 x 610 x 78	600	
F8 / MERV 14			
12 x 24 x 2	305 x 610 x 55	300	80
24 x 24 x 2	610 x 610 x 55	600	
12 x 24 x 3	305 x 610 x 78	300	75
24 x 24 x 3	610 x 610 x 78	600	

AstroCel I HT (180°C, 260°C)

Product Overview

- Individually tested for certified performance
- Available in a variety of metal cell sides and efficiencies
- High temperature models available up to 260°C
- High capacity option for higher airflow
- Available in gasket seal

Specification

EN1822	H13, 14
Filter Depth (mm)	149, 292
Media Type	Fibreglass
Frame Material	Stainless Steel
Separator Style	Aluminium
Gasket Material	Red Silicone Gasket
Sealant	White, Red Silicone
Faceguard	Optional
Special Size Available	Yes
Antimicrobial Available	No
Header Type	None Header
Recommended Final Resistance	750 Pa
Max Operating Temperature	180°C, 260°C

Product Information

Part Number	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Sealant Type
AstroCel® I HT-400 (H13)				
M656-263-004	610 x 305 x 149	425	250	WHITE SILICONE
M656-263-005	610 x 610 x 149	850		
M656-265-004	610 x 305 x 292	850		
M656-265-005	610 x 610 x 292	1,700		
AstroCel® I HT-400 (H14)				
M653-263-004	610 x 305 x 149	425	250	WHITE SILICONE
M653-263-005	610 x 610 x 149	850		
M653-265-004	610 x 305 x 292	850		
M653-265-005	610 x 610 x 292	1,700		
AstroCel® I HT-500 (H13)				
M656-267-004	610 x 305 x 149	425	250	RED SILICONE
M656-267-005	610 x 610 x 149	850		
M656-268-004	610 x 305 x 292	850		
M656-268-005	610 x 610 x 292	1,700		
AstroCel® I HT-500 (H14)				
M653-267-004	610 x 305 x 149	425	250	RED SILICONE
M653-267-005	610 x 610 x 149	850		
M653-268-004	610 x 305 x 292	850		
M653-268-005	610 x 610 x 292	1,700		

Gas-Phase Chemical Media, Cassettes and Delivery Devices

SAAFCarb

Product Overview

- Pelletized activated carbon media that removes toxic and impure contaminants from the atmosphere
- Quick and easy media changeovers
- Resists a wide range of impure gases
- Low pressure drop and high adsorptive capacity

Typical Properties

Raw Material	Virgin Coal
Shape	Cylindrical Pellet
Apparent Density (ASTM D2854)	0.5 g/cc (~30 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	4mm ± 10%
Total Ash Content (ASTM D2866)	< 12 wt. %
Moisture Content (ASTM D2867)	≤ 5 wt. %
Hardness (ASTM D3802)	≥ 95%
Abrasion	< 1%
Iodine Number (ASTM D4607)	≥ 1000 mg/g
CTC Rating (ASTM D5742)	≥ 60 wt. %
Removal Capacity	≥ 24 wt. % Butane, C_4H_{10}

Product Information

Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-002	SAAFCarb	13.6 / 30	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFCarb MA

Product Overview

- Manufactured exclusively for acidic corrosive environments
- Targeted contaminant removal capacity for acid gases
- Provides extended equipment protection with infrequent media changeovers
- Compatible for use in all carbon-based air filtration systems
- Low pressure drop and high adsorptive capacity

Typical Properties

Raw Material	Impregnated Coal
Shape	Cylindrical Pellet
Apparent Density (ASTM D2854)	0.6 g/cc (~40 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	4mm ± 10%
Total Ash Content (ASTM D2866)	< 12 wt. %
Moisture Content (ASTM D2867)	≤ 15 wt. %
Hardness (ASTM D3802)	≥ 95%
Abrasion	< 1%
Iodine Number (ASTM D4607)	≥ 1000 mg/g
Gas Capacity (ASTM D6646)	0.14 - 0.16 g, H_2S/cc media
CTC Rating (ASTM D5742)	≥ 60 wt. %
Impregnation (AAF 392-800-002-0)	≥ 6%, KOH
Removal Capacity	≥ 23 wt. %, H_2S

Product Information

Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-003	SAAFCarb MA	18.2 / 40	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFCarb MB

Product Overview

- Provides effective removal of ammonia gas
- Effective removal volatile organic compounds (VOCs)
- Low pressude drop
- Specifically impregnated media

Typical Properties

Raw Material	Impregnated Coal
Shape	Cylindrical Pellet
Apparent Density (ASTM D2854)	0.6 g/cc (~40 lb/ft^3) ± 15%
Pellet Diameter (ASTM D2862)	4mm ± 10%
Total Ash Content (ASTM D2866)	< 12 wt. %
Moisture Content (ASTM D2867)	≤ 25 wt. %
Hardness (ASTM D3802)	≥ 95%
Abrasion	< 1%
Iodine Number (ASTM D4607)	≥ 1000 mg/g
Gas Capacity (ASTM D6646)	0.03 - 0.05 g, NH_3/cc media
CTC Rating (ASTM D5742)	≥ 60 wt. %
Impregnation (AAF 392-800-002-0)	≥ 15%, H_3PO_4
Removal Capacity	≥ 5 wt. %, NH_3

Product Information

Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-004	SAAFCarb MB	18.2 /40	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFOxidant

Product Overview

- Removes and holds contaminants by chemical conversion
- Non-flammable and non-toxic
- Accurate service life testing
- Does not support bacterial and fungal growth
- Patent-pending high capacity formulation

Typical Properties

Raw Material	Chemical
Shape	Sphere Pellet
Apparent Density (ASTM D2854)	0.8 g/cc (~50 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	2.83 - 5.66 mm
Moisture Content (ASTM D2867)	≥ 15 wt. %
Crush Strength (AAF 392-800-002-4)	≥ 50N
Abrasion	≤ 4.5%
Gas Capacity (ASTM D6646)	0.08 - 0.10 g, H_2S/cc media
CTC Rating (ASTM D5742)	N/A
Impregnation (AAF 392-800-002-0)	≥ 8%, $KMnO_4$
Removal Capacity	≥ 14 wt. %, H_2S

Product Information

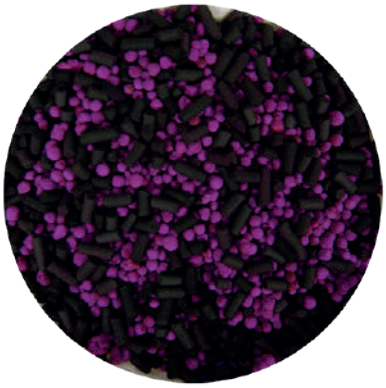
Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-010	SAAFOxidant	22.7 / 50	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFBlend GP

Product Overview

- Targets reactive compounds and volatile organic compounds
- Removes toxic and impure gases by physical adsorption
- Suitable for use in commercial and industrial applications
- Accurate service life testing
- Target contaminants include:
  - Formaldehyde
  - Hydrocarbons (VOCs)
  - Hydrogen sulfide
  - Lower molecular weight aldehydes and organic acids
  - Nitric oxide
  - Nitrogen dioxide
  - Sulfur dioxide



Typical Properties

	SAAFCarb	SAAFOxidant
Raw Material	Virgin Coal	Chemical
Shape	Cylindrical Pellet	Sphere Pellet
Apparent Density (ASTM D2854)	0.5 g/cc (~30 lb/ft^3) ± 10%	0.8 g/cc (~50 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	4mm ± 10%	2.83 - 5.66 mm
Total Ash Content (ASTM D2866)	< 12 wt. %	N/A
Moisture Content (ASTM D2867)	≤ 5 wt. %	≥ 15 wt. %
Crush Strength (AAF 392-800-002-4)	N/A	≥ 50N
Hardness (ASTM D3802)	≥ 95%	N/A
Abrasion	< 1%	≤ 4.5%
Iodine Number (ASTM D4607)	≥ 1000 mg/g	N/A
Gas Capacity (ASTM D6646)	N/A	0.08 - 0.10g H_2S/cc media
CTC Rating (ASTM D5742)	≥ 60 wt. %	N/A
Impregnation (AAF 392-800-002-0)	N/A	≥ 8%, $KMnO_4$
Removal Capacity	≥ 24 wt. %, C_4H_{10}	≥ 14 wt. %, H_2S

Product Information

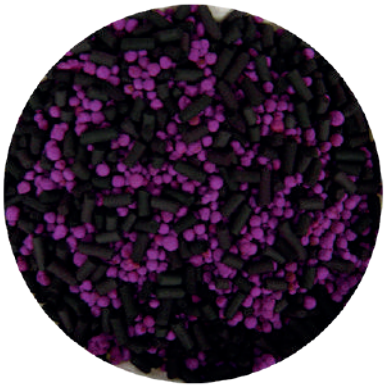
Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-012	SAAFBlend GP (50 / 50)	18.2 / 40	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFBlend CC

Product Overview

- Targets reactive compounds and Volatile Organic Compounds (VOCs)
- Suitable for use in all carbon-based air filtration systems
- Composed of SAAFCarb MA media and SAAFOxidant
- Low pressure drop and high adsorptive capacity
- Provides extended equipment protection with infrequent media changeovers
- Target contaminants include:
  - Hydrogen Sulphide (H_2S)
  - Sulphur Dioxide (SO_2)
  - Nitric Oxide (NO)
  - Nitrogen Dioxide (NO_2)
  - Formaldehyde (CH_2O)
  - Hydrocarbons
  - Lower molecular weight aldehydes and organic acids



Typical Properties

Typical Properties	SAAFCarb MA	SAAFOxidant
Raw Material	Impregnated Coal	Chemical
Shape	Cylindrical Pellet	Sphere Pellet
Apparent Density (ASTM D2854)	0.6 g/cc (~40 lb/ft^3) ± 10%	0.8 g/cc (~50 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	4 mm ± 10%	2.83 - 5.66 mm
Total Ash Content (ASTM D2866)	< 12 wt. %	N/A
Moisture Content (ASTM D2867)	≤ 15 wt. %	≥ 15 wt. %
Crush Strength	N/A	≥ 50 N
Hardness (ASTM D3802)	≥ 95%	N/A
Abrasion	< 1%	≤ 4.5%
Iodine Number (ASTM D4607)	≥ 1000 mg/g	N/A
Gas Capacity (ASTM D6646)	0.14-0.16, H_2S/cc media	0.08-0.10, H_2S/cc media
CTC Rating (ASTM D5742)	≥ 60 wt. %	N/A
Impregnation	≥ 6%, KOH	≥ 8%, $KMnO_4$
Removal Capacity	≥ 23 wt. %, H_2S	≥ 14 wt. %, H_2S

Product Information

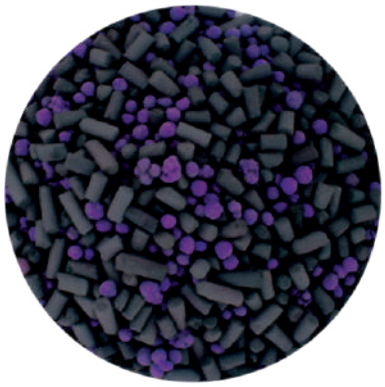
Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-018	SAAFBlend CC (50 / 50)	20.0 / 44	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAFBlend WS

Product Overview

- Targets acidic gases, volatile organic compounds, relative molecular weight organics
- Accurate service life testing
- Target contaminants include:
  - Formaldehyde
  - Hydrocarbons (VOCs)
  - Hydrogen sulfide
  - Lower molecular weight aldehydes and organic acids
  - Nitric oxide
  - Nitrogen dioxide
  - Sulfur dioxide



Typical Properties

Typical Properties	SAAFCarb	SAAFCarb MA	SAAFOxidant
Raw Material	Virgin Coal	Impregnated Coal	Chemical
Shape	Cylindrical Pellet	Cylindrical Pellet	Sphere Pellet
Apparent Density (ASTM D2854)	0.5 g/cc (~30 lb/ft^3) ± 10%	0.6 g/cc (~40 lb/ft^3) ± 10%	0.8 g/cc (~50 lb/ft^3) ± 10%
Pellet Diameter (ASTM D2862)	4mm ± 10%	4mm ± 10%	2.83 - 5.66 mm
Total Ash Content (ASTM D2866)	< 12 wt. %	< 12 wt. %	N/A
Moisture Content (ASTM D2867)	≤ 5 wt. %	≤ 15 wt. %	≥ 15 wt. %
Crush Strength (AAF 392-800-002-4)	N/A	N/A	≥ 50N
Hardness (ASTM D3802)	≥ 95%	≥ 95%	N/A
Abrasion	< 1%	< 1%	≤ 4.5%
Iodine Number (ASTM D4607)	≥ 1000 mg/g	≥ 1000 mg/g	N/A
Gas Capacity (ASTM D6646)	N/A	0.14 - 0.16g, H2S/cc media	0.08 - 0.10g H_2S/cc media
CTC Rating (ASTM D5742)	≥ 60 wt. %	≥ 60 wt. %	N/A
Impregnation (AAF 392-800-002-0)	N/A	≥ 6%, KOH	≥ 8%, $KMnO_4$
Removal Capacity	≥ 24 wt. %, C_4H_{10}	≥ 23 wt. %, H2S	≥ 14 wt. %, H_2S

Product Information

Part Number	Media Type	Media Weight per Box (kg / lb)	Box Volume (Cubic Meter / Cubic Feet)
M403-000-013	SAAFBlend WS (33 / 33 / 33)	18.2 / 40	0.0283 / 1

**Sold in one cubic foot box packaging only.*

SAAF Cassette Medium Duty

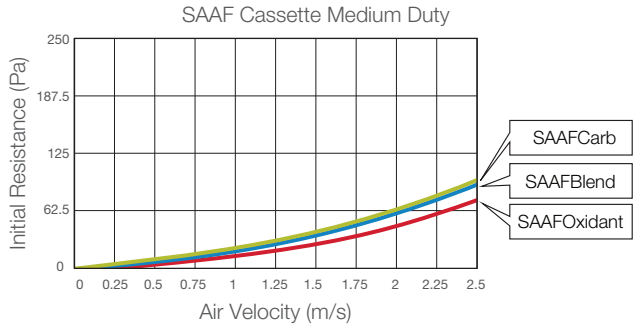
Product Overview

- More energy-efficient than any other competitive cassette
- Designed for full media utilization
- Improves fit and sealing integrity in any cassette holding system
- Glue-free design eliminates off-gassing, bypass, and leakage
- Multiple patents pending

Specification

Filter Depth (mm)	441
Chemical Bed Depth (mm)	25
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Frame Material	Plastic

Initial Resistance vs. Air Velocity



Product Information

Part Number	Nominal Size Inches (H x W x D)	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Media Type	Media Weight (kg / lb)
M400-018-002N	6 x 12 x 18	143 x 295 x 441	425	88	SAAFCarb	3.6 / 8
M400-018-003N	6 x 12 x 18	143 x 295 x 441			SAAFCarb MA	4.5 / 10
M400-018-004N	6 x 12 x 18	143 x 295 x 441			SAAFCarb MB	4.6 / 10
M400-018-010N	6 x 12 x 18	143 x 295 x 441		78	SAAFOxidant	5.5 / 12
M400-018-012N	6 x 12 x 18	143 x 295 x 441		85	SAAFBlend GP	4.6 / 10
M400-018-013N	6 x 12 x 18	143 x 295 x 441			SAAFBlend WS	4.6 / 10

**Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

SAAF Cassette Heavy Duty

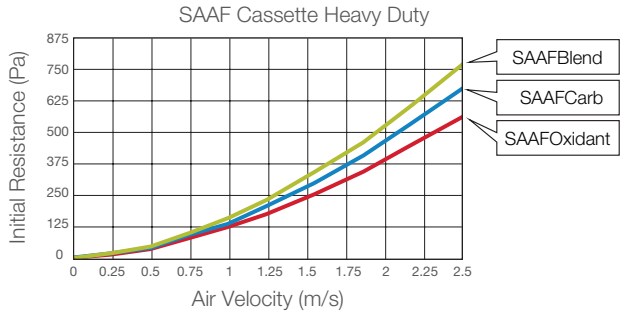
Product Overview

- More energy-efficient than any other competitive cassette
- Designed for full media utilization
- Improves fit and sealing integrity in any cassette holding system
- Glue-free design eliminates off-gassing, bypass, and leakage
- Multiple patents pending

Specification

Filter Depth (mm)	295
Chemical Bed Depth (mm)	75
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Frame Material	Plastic

Initial Resistance vs. Air Velocity



Product Information

Part Number	Nominal Size Inches (H x W x D)	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Media Type	Media Weight (kg / lb)
M400-012-002N	12 x 12 x 12	295 x 295 x 295	425	215	SAAFCarb	7.2 / 16
M400-012-003N	12 x 12 x 12	295 x 295 x 295			SAAFCarb MA	8.9 / 20
M400-012-004N	12 x 12 x 12	295 x 295 x 295			SAAFCarb MB	9.2 / 20
M400-012-010N	12 x 12 x 12	295 x 295 x 295		183	SAAFOxidant	11.0 / 24
M400-012-012N	12 x 12 x 12	295 x 295 x 295		243	SAAFBlend GP	9.1 / 20
M400-012-013N	12 x 12 x 12	295 x 295 x 295			SAAFBlend WS	9.1 / 20

**Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

SAAF Cassette Cleanroom Grade

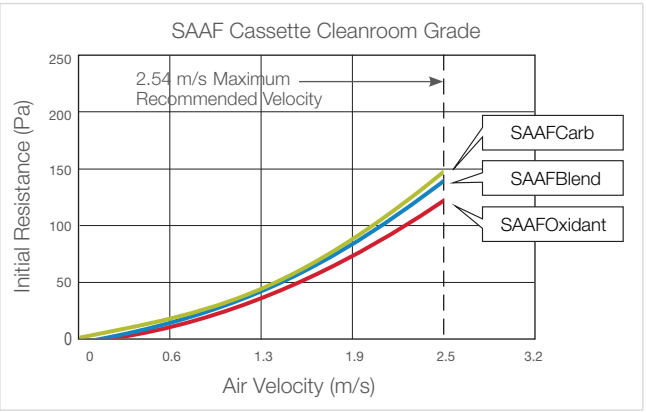
Product Overview

- More energy-efficient than any other competitive cassette
- Designed for full media utilization
- Improves fit and sealing integrity in any cassette holding system
- Glue-free design eliminates off-gassing, bypass, and leakage
- Multiple patents pending

Specification

Filter Depth (mm)	295
Chemical Bed Depth (mm)	25
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Frame Material	Plastic

Initial Resistance vs. Air Velocity



Product Information

Part Number	Nominal Size Inches (H x W x D)	Actual Size mm (H x W x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Media Type	Media Weight (kg / lb)
M400-024-002N	24 x 12 x 12	595 x 295 x 295	1,700	140	SAAFCarb	10.1 / 22
M400-024-003N	24 x 12 x 12	595 x 295 x 295			SAAFCarb MA	12.5 / 28
M400-024-004N	24 x 12 x 12	595 x 295 x 295			SAAFCarb MB	12.9 / 28
M400-024-010N	24 x 12 x 12	595 x 295 x 295		118	SAAFOxidant	15.5 / 34
M400-024-012N	24 x 12 x 12	595 x 295 x 295		143	SAAFBlend GP	12.8 / 28
M400-024-013N	24 x 12 x 12	595 x 295 x 295			SAAFBlend WS	12.8 / 28

**Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

Carbon Tray

Product Overview

- Sturdy Construction
- Ease of Use
- Customized dimensions
- Optional prefilled with user-specific chemical media

Specification

Filter Depth (mm)	22, 44
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Frame Material (Standard)	Galvanised Steel with Black Powder coated
Frame Material (Optional)	Stainless Steel, Aluminium
Special Size Available	Yes
Max Operating Temperature	51°C

Product Information

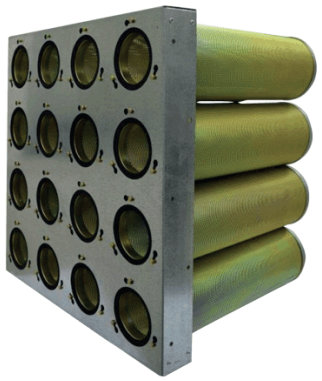
Part Number	Actual Size mm (W x H x D)	Media Weight (kg / lb)	Media Type
M472-202-080	594 x 594 x 22	4.20 / 9.3	SAAFCarb
M472-203-080		5.10 / 11.2	SAAFCarb MA
M472-204-080		5.30 / 11.7	SAAFCarb MB
M472-210-080		6.40 / 14.1	SAAFOxidant
M472-212-080		5.30 / 11.7	SAAFBlend GP
M472-202-036	594 x 594 x 44	8.30 / 18.3	SAAFCarb
M472-203-036		10.30 / 22.7	SAAFCarb MA
M472-204-036		10.60 / 23.4	SAAFCarb MB
M472-210-036		12.70 / 28.0	SAAFOxidant
M472-212-036		10.60 / 23.4	SAAFBlend GP

**Other sizes are available upon request.*
***Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

SAAFCanister Holding Frame

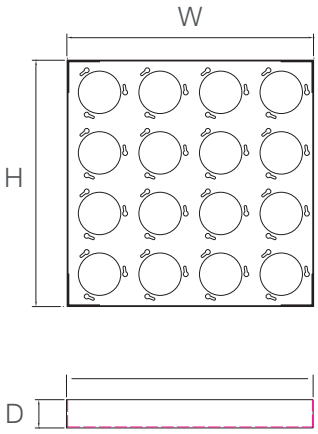
Product Overview

- Installation frame for SAAFCanister
- Available in metal



Specification

Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Stainless Steel
Number of Canister	4 - 16



Product Information

Part Number	Actual Size mm (H x W x D)	Number of Canisters
M980-201-003	305 x 305 x 70	4
M980-202-001	305 x 610 x 70	8
M980-205-004	457 x 610 x 70	12
M980-203-002	610 x 610 x 70	16

SAAFCanister

Product Overview

- Ease of use
- Available in metal and plastic
- Standard dimensions
- Optional prefilled with user-specific chemical media

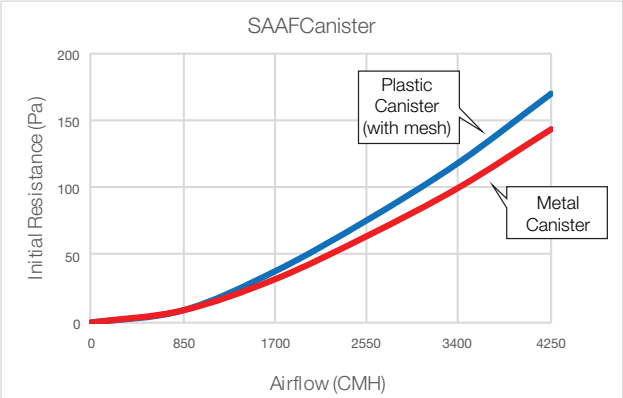
More Features

- Unique bayonet-style clamping mechanism, no special tools needed for canister installation and media replacement
- Corrosion free: stainless steel metal part
- Media refillable option compare to competitors
- Lightweight
- Optional inner and outer mesh to reduce the media dust
- Standard dimensions, direct interchange is possible

Specification

Plastic Filter Depth (mm)	450, 600
Metal Filter Depth (mm)	452, 600
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Frame Material (Standard)	Plastic, Galvanised Steel
Frame Material (Optional)	Stainless Steel

Initial Resistance vs. Airflow



Product Information

Part Number	Actual Size (mm)	Volume (m^3)	Frame Material	Media Weight (kg / lb)	Media Type
M960-331-023	ø145 x 450	0.0044	Plastic	2.4 / 5	SAAFCarb
M960-332-023	ø145 x 450	0.0044	Plastic	3.0 / 7	SAAFCarb MA
M960-333-023	ø145 x 450	0.0044	Plastic	3.1 / 7	SAAFCarb MB
M960-334-023	ø145 x 450	0.0044	Plastic	3.7 / 8	SAAFOxidant
M960-335-023	ø145 x 450	0.0044	Plastic	3.1 / 7	SAAFBlend GP
M960-331-021	ø145 x 600	0.0059	Plastic	3.2 / 7	SAAFCarb
M960-332-021	ø145 x 600	0.0059	Plastic	4.0 / 9	SAAFCarb MA
M960-333-021	ø145 x 600	0.0059	Plastic	4.1 / 9	SAAFCarb MB
M960-334-021	ø145 x 600	0.0059	Plastic	4.9 / 11	SAAFOxidant
M960-335-021	ø145 x 600	0.0059	Plastic	4.1 / 9	SAAFBlend GP
M960-201-012	ø145 x 452	0.0044	Galvanised Steel	2.4 / 5	SAAFCarb
M960-202-012	ø145 x 452	0.0044	Galvanised Steel	3.0 / 7	SAAFCarb MA
M960-203-012	ø145 x 452	0.0044	Galvanised Steel	3.1 / 7	SAAFCarb MB
M960-204-012	ø145 x 452	0.0044	Galvanised Steel	3.7 / 8	SAAFOxidant
M960-205-012	ø145 x 452	0.0044	Galvanised Steel	3.1 / 7	SAAFBlend GP
M960-201-011	ø145 x 600	0.0059	Galvanised Steel	3.2 / 7	SAAFCarb
M960-202-011	ø145 x 600	0.0059	Galvanised Steel	4.0 / 9	SAAFCarb MA
M960-203-011	ø145 x 600	0.0059	Galvanised Steel	4.1 / 9	SAAFCarb MB
M960-204-011	ø145 x 600	0.0059	Galvanised Steel	4.9 / 11	SAAFOxidant
M960-205-011	ø145 x 600	0.0059	Galvanised Steel	4.1 / 9	SAAFBlend GP

**Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

Gas-Phase Equipment and Design Services

SAAF Front Access Housing (FAH)

Product Overview

- Combines particulate filters and gas-phase cassettes to create a total clean air solution
- Stand-alone system can be easily incorporated into new and existing air handling units

Product Information

Model	Height (mm)	Width (mm)	Length Of The Housing (mm)
SAAF FAH - Medium Duty (for use with MD Cassettes Only)			
FAH 202-2P-MD	610	610	680
FAH 201-2P-MD	610	305	680
FAH 102-2P-MD	305	610	680
SAAF FAH - Heavy Duty (for use with HD Cassettes Only)			
FAH 202-2P-HD	610	610	530
FAH 201-2P-HD	610	305	530
FAH 102-2P-HD	305	610	530

SAAF Air Purification Systems: Pressurization and Recirculation Unit (PRU) Recirculation Unit (RU)

Product Overview

- Pressurize, recirculate, and clean the air in a controlled environment
- Easy installation, operation, and maintenance in a self-contained system
- Combines gas-phase and high efficiency air filters to create total clean air solutions
- Patent-pending SAAF Seal provides superior filtration efficiency
- Designed with internal variable speed fan (electronically commutated)
- Customizable media combinations to meet your specific requirements
- Whisper-quiet operation

Specification

Main Structure	Aluminium
Panel Material	Double Wall
Insulation	PU
Pre-Filter Depth (mm)	44
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Number of Bed	2
Seconday Filter Depth (mm)	44
Fan Type	Direct Drive Centrifugal EC
Final Filter Depth (mm)	104

Product Information

Model	Actual Size mm (W x H x D)	Filter Quantity				Power Supply
		Pre-Filter	Cassette	Secondary Filter	Final Filter	
RU1000V	796 x 711 x 2100	1	8	1	1	1ph/230VAC
RU2000V	1491 x 711 x 2100	2	16	2	2	3ph/400VAC
PRU1000V	796 x 711 x 2230	1	8	1	1	1ph/230VAC
PRU2000V	1491 x 711 x 2230	2	16	2	2	3ph/400VAC

SAAF Side Access Housings (SAH)

Product Overview

- Combines particulate fitlers, gas-phase cassettes, and high-efficiency filters to create a total clean air solution (removing both airborne particulate and gaseous contaminants)
- Patent-pending SAAF Seal provides the best seal available and superior filtration efficiency
- Wide range of sizes and combinations of filters banks
- Available with internal fan
- Insulated double-walled construction
- Allows for easy installation, operation, and maintenance in a totally self-contained system

Specification

Main Structure	Aluminium
Panel Material	Double Wall
Insulation	PU
Pre-Filter Depth (mm)	44 - 46
Secondary Filter	Optional
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Number of Bed	1, 2
Bed Depth (mm)	25, 75
Manometer	Included

Product Information

Model	Height (mm)	Width (mm)	Type & Length Of The Housing (mm)		
			MD	HD	CG
SAH 1 Pass					
202	900	710	1500	1400	1400
204	900	1304	1500	1400	1400
302	1200	710	1500	1400	1400
304	1200	1304	1500	1400	1400
404	1500	1304	1500	1400	1400
406	1500	1900	1500	1400	1400
504	1800	1304	1500	1400	1400
506	1800	1900	1500	1400	1400
508	1800	2490	1500	1400	1400
606	2100	1900	1500	1400	1400
608	2100	2490	1500	1400	1400
SAH 2 Pass					
202	900	710	2100	1900	1900
204	900	1304	2100	1900	1900
302	1200	710	2100	1900	1900
304	1200	1304	2100	1900	1900
404	1500	1304	2100	1900	1900
406	1500	1900	2100	1900	1900
504	1800	1304	2100	1900	1900
506	1800	1900	2100	1900	1900
508	1800	2490	2100	1900	1900
606	2100	1900	2100	1900	1900
608	2100	2490	2100	1900	1900

*Filter Arrangement: SAH XXX-2P-MD(HD)(CG)-MD(HD)(CG)(Option)-4F

SAAF Deep Bed Scrubber (DBS)

Product Overview

- Combines AAF's particulate and gas-phase technologies for an AAF Total Filtration Solution
- Provides highest chemical media-to-air ratio for heavily polluted environments that require air quality guarantees and optimal cost of ownership
- Available with internal fan: wide range of sizes and combination of AAF Filtration technologies
- Offers the best flexibility and control to adapt to changes in the environment

Specification

Main Structure	Aluminium
Panel Material	Double Wall
Insulation	PU
Pre-Filter Depth (mm)	44 - 46
Secondary Filter	Optional
Media Type	Carbon, Impregnated Carbon, Chemical, Blended
Number of Bed	1, 2
Bed Depth (mm)	300
Manometer	Included

Product Information

Model	Height (mm)	Width (mm)	Length Of The Housing (mm)
DBS 1 Pass			
202	900	710	1300
204	900	1304	1300
302	1200	710	1300
304	1200	1304	1300
404	1500	1304	1300
406	1500	1900	1300
504	1800	1304	1300
506	1800	1900	1300
508	1800	2490	1300
606	2100	1900	1300
608	2100	2490	1300
DBS 2 Pass			
202	900	710	1600
204	900	1304	1600
302	1200	710	1600
304	1200	1304	1600
404	1500	1304	1600
406	1500	1900	1600
504	1800	1304	1600
506	1800	1900	1600
508	1800	2490	1600
606	2100	1900	1600
608	2100	2490	1600

*Filter Arrangement: DBS XXX-2P-12M-12M(Option)-4F

SAAF Reactivity Monitoring Coupons (RMCs)

Product Overview

- Investigative tool to gauge gas-phase filter performance
- Ideal for site assessment reports related to air reactivity
- Identifies the presence of gas types (sulphur compunds, chlorine compounds, compounds from oxide films, and unknowns)
- Quantifies reactivity of environment as per ISA-71.04-2013 and related coupon standards

SAAF Reactivity Monitoring Coupon (Metal) p/n: M410-001-001

Product Information

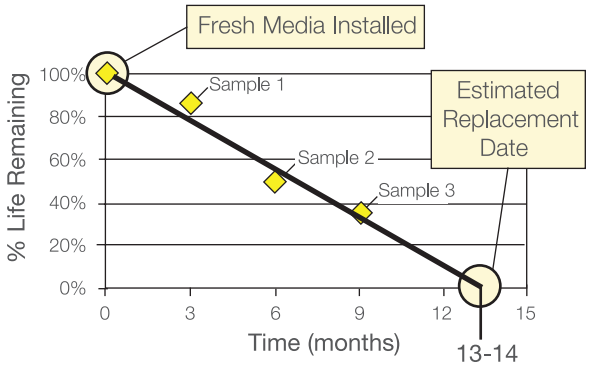
Part Number	Description	Classifications	Exposure Time
M410-001-001	SAAF Reactivity Monitoring Coupons (Metal)	G1, G2, G3, GX	30 days (Recommended)

SAAF Chemical Media Remaining Life Analysis (RLA)

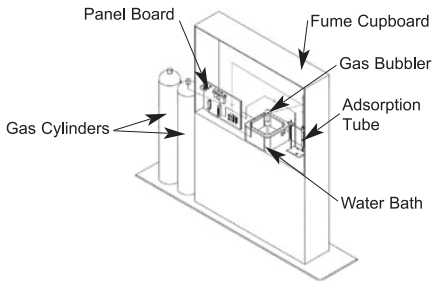
Product Overview

- Estimates remaining life, replacement schedules, and inventory requirements for chemical media and gas-phase filters
- Provides information to optimize media choices and maximize system life
- Controls cost by ensuring replacement of media at the proper time

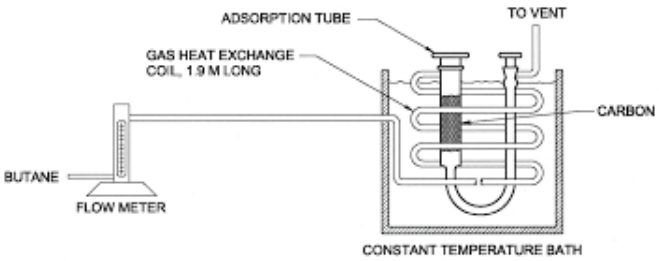
Remaining Life Analysis Trend



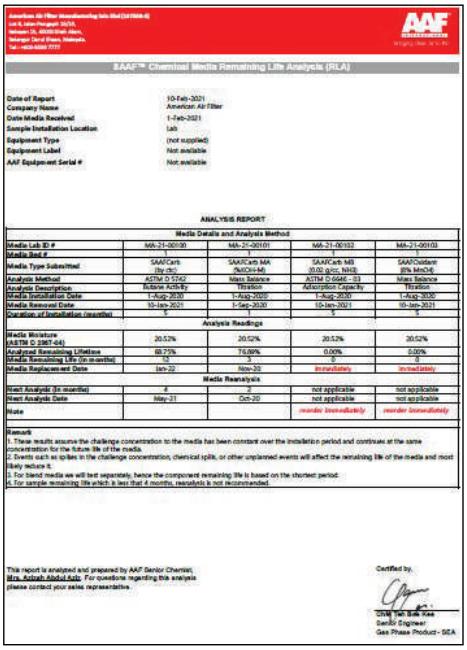
Chemical Media Gas Challenge Testing (ASTM D 6646-03)



Carbon Butane Activity Testing (ASTM D 5742)



Mass Balance (Titration)



Detailed example of AAF's Remaining Life Analysis Report

Gas-Phase Filters

AmerSorb P

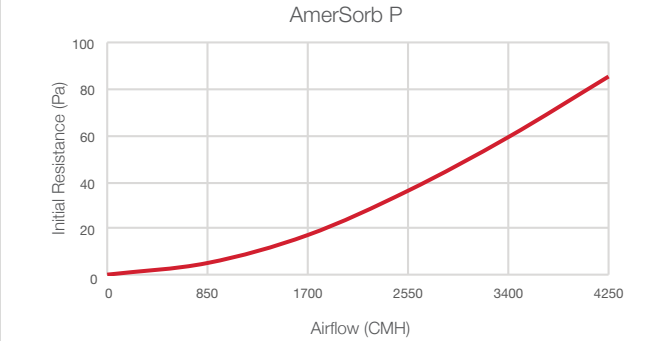
Product Overview

- IAQ Filter
- Removes gases and odors
- Carbon is bonded to a substrate of non-woven polyester bi-component fibres
- Self-supporting media - no metal
- Safer handling and convenient incinerator or shredder disposal
- No carbon dusting
- Easy disposal

Specification

Filter Depth (mm)	22, 44, 95
Media Type	Carbon
Frame Material	Moisture Resistant Beverage Board
Special Size Available	Yes
Antimicrobial Available	No
Reccomended Final Resistance	250 Pa
Max Operating Temperature	51°C

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M402-290-105	12 x 24 x 1	289 x 594 x 22	1,700	100
M402-290-106	20 x 24 x 1	492 x 594 x 22	2,800	
M402-290-101	24 x 24 x 1	594 x 594 x 22	3,400	
M402-290-205	12 x 24 x 2	289 x 594 x 44	1,700	90
M402-290-206	20 x 24 x 2	492 x 594 x 44	2,800	
M402-290-201	24 x 24 x 2	594 x 594 x 44	3,400	
M402-291-405	12 x 24 x 4	289 x 594 x 95	1,700	60
M402-291-406	20 x 24 x 4	492 x 594 x 95	2,800	
M402-291-401	24 x 24 x 4	594 x 594 x 95	3,400	

AmAir/C, AmAir/C+SAAFOxi

Product Overview

- Disposable filter for economical, effective, gas-phase and particulate filtration
- Economical solution to many gaseous contaminant problems including odors
- Carbon (AmAir/C)
- Blended carbon and chemical (AmAir/C+ SAAFOxi)
- Odor removal and corrosion control protection
- Easy to install
- Directly interchangeable with standard air filters
- Granular media is integrated to a substrate of non-woven fibres

Specification

EN779	G4
ASHRAE 52.2	MERV 7
Filter Depth (mm)	22, 44, 95
Media Type	Carbon, Blended
Frame Material	Moisture Resistance Beverage Board
Special Size Available	Yes
Antimicrobial Available	No
Recommended Filter Resistance	250 Pa
Max Operating Temperature	51°C

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AmAir/C				
M182-111-319	12 x 24 x 1	289 x 594 x 22	1,700	103
M182-111-782	20 x 24 x 1	492 x 594 x 22	2,800	
M182-111-863	24 x 24 x 1	594 x 594 x 22	3,400	
M182-112-319	12 x 24 x 2	289 x 594 x 44	1,700	90
M182-112-782	20 x 24 x 2	492 x 594 x 44	2,800	
M182-112-863	24 x 24 x 2	594 x 594 x 44	3,400	
M182-114-319	12 x 24 x 4	289 x 594 x 95	1,700	75
M182-114-782	20 x 24 x 4	492 x 594 x 95	2,800	
M182-114-863	24 x 24 x 4	594 x 594 x 95	3,400	
AmAir/C+SAAFOxi				
M182-101-319	12 x 24 x 1	289 x 594 x 22	1,700	103
M182-101-782	20 x 24 x 1	492 x 594 x 22	2,800	
M182-101-863	24 x 24 x 1	594 x 594 x 22	3,400	
M182-102-319	12 x 24 x 2	289 x 594 x 44	1,700	90
M182-102-782	20 x 24 x 2	492 x 594 x 44	2,800	
M182-102-863	24 x 24 x 2	594 x 594 x 44	3,400	
M182-104-319	12 x 24 x 4	289 x 594 x 95	1,700	75
M182-104-782	20 x 24 x 4	492 x 594 x 95	2,800	
M182-104-863	24 x 24 x 4	594 x 594 x 95	3,400	

VariSorb PF

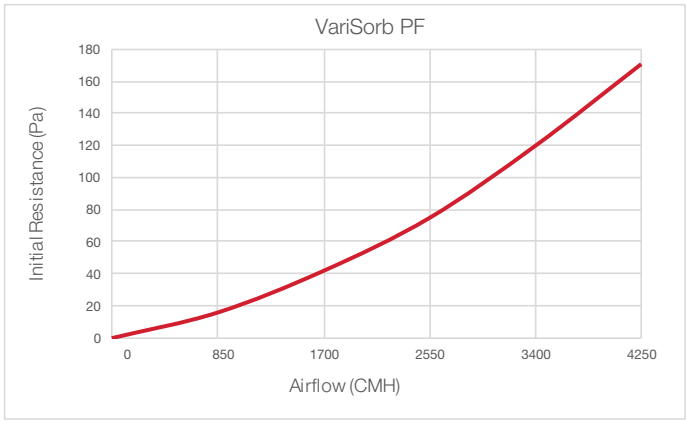
Product Overview

- Particulate and gaseous contaminants removal
- Micro pores activated carbon media, high adsorption
- Ideal solution for haze
- Corrosion free
- Non-metal construction
- Fully incinerable
- Clean Product
- Direct replacement with standard 44 - 48 mm pre-filters
- Micro pores impregnated carbon embedded between polymer fibres

Specification

EN779	G4
ISO 16890	ePM10 55%
Filter Depth (mm)	48
Media Type	Impregnated Carbon
Frame Material	Plastic
Gas Removal Initial Efficiency	> 95%
Recommended Filter Resistance	250 Pa
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	Acid

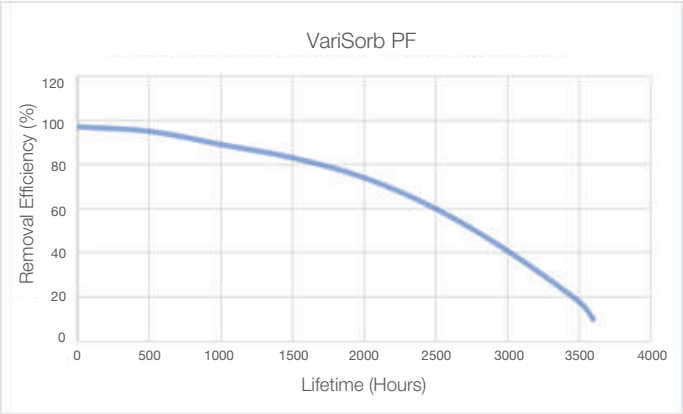
Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M406-100-002	12 x 24 x 2	289 x 594 x 48	1,700	120
M406-100-001	24 x 24 x 2	594 x 594 x 48	3,400	

Removal Efficiency Curve



VariCel RF/C, VariCel RF/C+SAAFOxi

Product Overview

- Carbon (VariCel RF/C)
- Blended carbon & chemical (VariCel RF/C+SAAFOxi)
- Particulate and gaseous contaminant removal
- MERV 8
- Single, double, and no-header models
- Mini carbon granules embedded in non-woven synthetic layers

Specification

EN 779	G4
ASHRAE 52.2	MERV 8
Filter Depth (mm)	149, 292
Media Type	Carbon, Blended, Impregnated Carbon, Ion Exchange Resin
Frame Material (Standard)	Galvanised Steel
Frame Material (Optional)	Aluminium, Stainless Steel, Plastic (Non Header)
Special Size Available	Yes
Header Type	Single, Double, Non Header
Recommended Final Resistance	250 Pa
CTC	≥ 60 wt. %
Target Gas	VOC, Acid, Base

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Header Type	Rated Initial Resistance (Pa)	Media
VariCel RF/C						
M420-221-001	24 x 24 x 12	594 x 594 x 292	3,400	DH	108	Carbon
M420-221-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-321-001	24 x 24 x 12	594 x 594 x 292	3,400	SH		
M420-321-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-421-001	24 x 24 x 12	594 x 594 x 292	3,400	NH		
M420-421-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-211-001	24 x 24 x 12	594 x 594 x 292	3,400	DH	110	VOC
M420-211-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-311-001	24 x 24 x 12	594 x 594 x 292	3,400	SH		
M420-311-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-411-001	24 x 24 x 12	594 x 594 x 292	3,400	NH		
M420-411-004	12 x 24 x 12	289 x 594 x 292	1,700			
VariCel RF/C+SAAFOxi						
M420-241-001	24 x 24 x 12	594 x 594 x 292	3,400	DH	108	Blend GP
M420-241-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-341-001	24 x 24 x 12	594 x 594 x 292	3,400	SH		
M420-341-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-441-001	24 x 24 x 12	594 x 594 x 292	3,400	NH		
M420-411-004	12 x 24 x 12	289 x 594 x 292	1,700			
VariCel RF/C Acid						
M420-231-001	24 x 24 x 12	594 x 594 x 292	3,400	DH	75	Acid IAC + IER Media
M420-231-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-331-001	24 x 24 x 12	594 x 594 x 292	3,400	SH		
M420-331-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-431-001	24 x 24 x 12	594 x 594 x 292	3,400	NH		
M420-431-004	12 x 24 x 12	289 x 594 x 292	1,700			
VariCel RF/C Base						
M420-251-001	24 x 24 x 12	594 x 594 x 292	3,400	DH	75	NH_3 IER Media
M420-251-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-351-001	24 x 24 x 12	594 x 594 x 292	3,400	SH		
M420-351-004	12 x 24 x 12	289 x 594 x 292	1,700			
M420-451-001	24 x 24 x 12	594 x 594 x 292	3,400	NH		
M420-451-004	12 x 24 x 12	289 x 594 x 292	1,700			

**Other sizes and specifications are available upon request.*

VariSorb XL

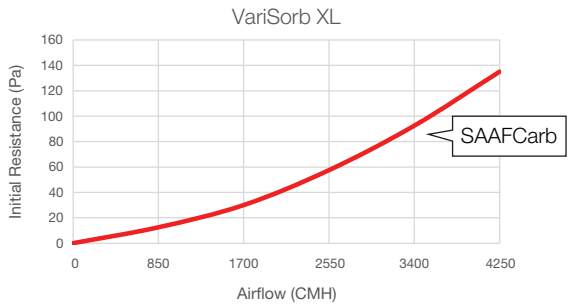
Product Overview

- Highest-activity carbon
- Effective in removing VOCs, SOx, NOx, and Ozone
- Energy-efficient mini-pleat design
- Corrosion-free, non-metal construction
- Easy to retrofit particulate installations
- Fully incinerable
- Mini carbon granule embedded in non-woven synthetic layers

Specification

Filter Depth (mm)	304
Media Type	Carbon, Impregnated Carbon
Frame Material	Plastic
Special Size Available	No
Header Type	Single Header
Recommended Final Resistance	375 Pa
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	VOC, Acid, Base

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
SAAFCarb				
M401-111-003N	24 x 12 x 12	592 x 287 x 304	1,700	95
M401-111-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M401-111-001N	24 x 24 x 12	592 x 592 x 304	3,400	
SAAFCarb MA				
M401-211-003N	24 x 12 x 12	592 x 287 x 304	1,700	68
M401-211-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M401-211-001N	24 x 24 x 12	592 x 592 x 304	3,400	
SAAFCarb MB				
M401-311-003N	24 x 12 x 12	592 x 287 x 304	1,700	68
M401-311-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M401-311-001N	24 x 24 x 12	592 x 592 x 304	3,400	

VariSorb XL SAAF City

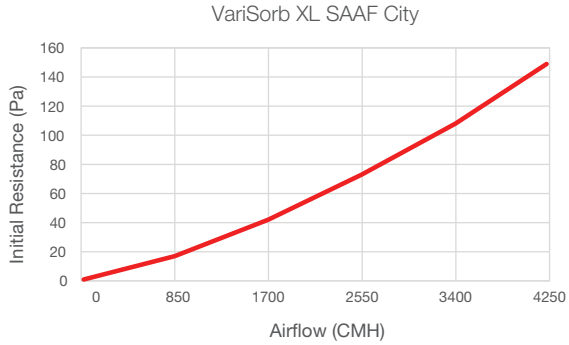
Product Overview

- Specially designed for Urban VOC's
- Standard dimensions
- Sturdy construction
- Corrosion-free, non-metal construction
- Fully incinerable
- Intergrated prefilter M5
- Mini carbon granules embedded in synthetic layers

Specification

EN 779	M5
Filter Depth (mm)	304
Media Type	Carbon
Frame Material	Plastic
Special Size Available	No
Header Type	Single Header
Recommended Final Resistance	375 Pa
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	VOC

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M408-111-003N	24 x 12 x 12	592 x 287 x 304	1,700	106
M408-111-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M408-111-001N	24 x 24 x 12	592 x 592 x 304	3,400	

VariSorb XL 15

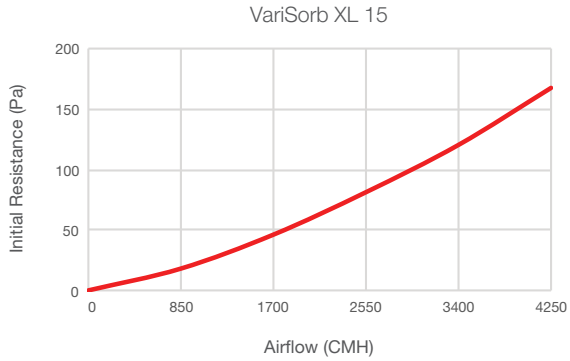
Product Overview

- High-efficiency filters designed to improve Indoor Air Quality
- Suitable for retrofit into existing HVAC systems, specification in new construction, or for direct replacement of 292 mm. depth, single-header filters
- Particulate and gaseous contaminant removal
- Highest activity carbon = highest adsorption
- Energy-effcient mini-pleat design
- Corrosion-free, non-metal construction
- Can assist in meeting National Ambient Air Quality Standards in nonattainment areas
- Mini carbon granules embedded in synthetic layers

Specification

EN 779	F9
ASHRAE 52.2	MERV 15
Filter Depth (mm)	304
Media Type	Carbon
Frame Material	Plastic
Special Size Available	No
Header Type	Single Header
Recommended Final Resistance	375 Pa
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	VOC

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M421-111-003N	24 x 12 x 12	592 x 287 x 304	1,700	120
M421-111-002N	24 x 20 x 12	592 x 490 x 304	2,800	
M421-111-001N	24 x 24 x 12	592 x 592 x 304	3,400	

VariSorb HC

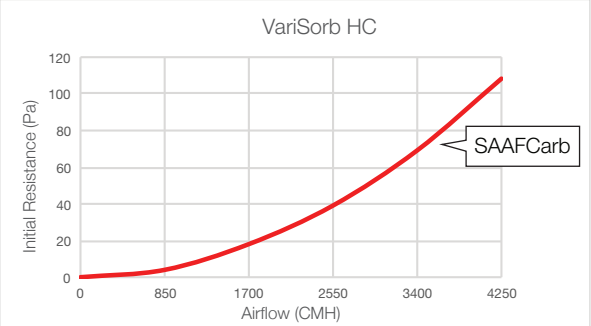
Product Overview

- High chemical media content
- Low resistance V-bank design
- Polypropylene honeycomb structure filled with media, sealed with retaining fine mesh scrim
- Corrosion-free, non-metal construction
- Optional prefilled with user-specific chemical media
- Fully incinerable

Specification

Filter Depth (mm)	304
Media Type	Carbon, Chemical, Blended
Frame Material	Plastic
Special Size Available	No
Header Type (Standard)	Single Header
Recommended Final Resistance	375 Pa
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	VOC, Acid, Base

Initial Resistance vs. Airflow



Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Media Weight (kg / lb)	Media Type
M411-000-001N	24 x 24 x 12	592 x 592 x 304	7.6 / 16.8	SAAFCarb
M411-100-001N	24 x 24 x 12	592 x 592 x 304	13.6 / 30.0	SAAFOxidant
M411-200-001N	24 x 24 x 12	592 x 592 x 304	11.0 / 24.2	SAAFBlend GP
M411-300-001N	24 x 24 x 12	592 x 592 x 304	9.1 / 20.0	SAAFCarb MA
M411-400-001N	24 x 24 x 12	592 x 592 x 304	9.1 / 20.0	SAAFCarb MB
M411-000-003N	24 x 12 x 12	592 x 287 x 304	4.0 / 8.8	SAAFCarb
M411-100-003N	24 x 12 x 12	592 x 287 x 304	5.2 / 11.4	SAAFOxidant
M411-200-003N	24 x 12 x 12	592 x 287 x 304	4.0 / 8.8	SAAFBlend GP
M411-300-003N	24 x 12 x 12	592 x 287 x 304	5.7 / 12.6	SAAFCarb MA
M411-400-003N	24 x 12 x 12	592 x 287 x 304	5.7 / 12.6	SAAFCarb MB

**Add 5% extra on media weight for media replacement due to there will be abrasion during handling.*

VariSorb PCY

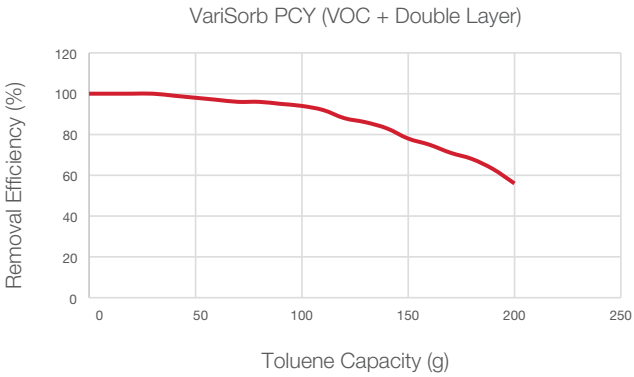
Product Overview

- Ideal for a wide range of applications
- Easy to install
- Sturdy construction
- Lightweight
- Corrosion resistant
- Easy to integrate in air filtration systems
- Clean product
- Nano carbon embedded in polymer composite matrix layers

Specification

Standard Filter Depth (mm)	610
Media Type	Carbon, Impregnated Carbon
Frame Material	Galvanised Steel
Gas Removal Initial Efficiency	> 95%
Max Operating Temperature	51°C
CTC	≥ 60 wt. %
Target Gas	VOC, Acid

Removal Efficiency Curve



Product Information

Part Number	Actual Size (mm)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)	Media Layer
VOC				
M418-201-001	Ø145 x 610	3,400	130	Single
M418-202-001	Ø145 x 610		145	Double
Acid				
M418-203-001	Ø145 x 610	3,400	130	Single
M418-204-001	Ø145 x 610		145	Double

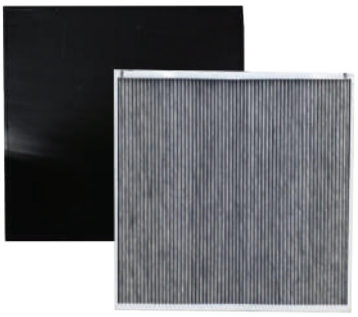
**Airflow is based on 16 canisters in a 24x24 canister holding frame. Other sizes and specifications are available upon request.*

SAAF TY Chemical Filter

Product Overview

- Low operation cost with replaceable chemical media tray
- Multi-tray filter with carbon tray filter or pleated media pack
- High removal efficiency
- Wide range of media or custom blends for specific application
- Easy to install

Carbon Tray Filters

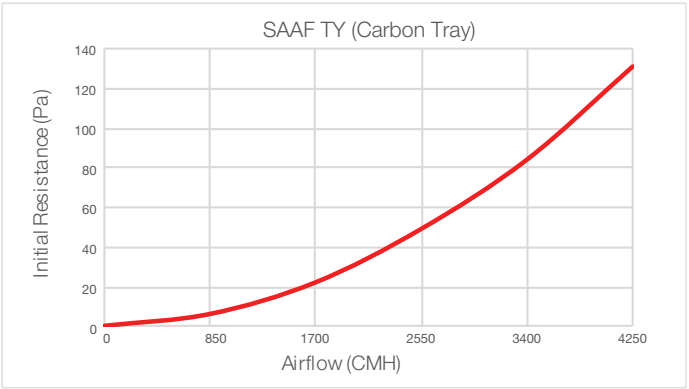


Pleated Media Packs

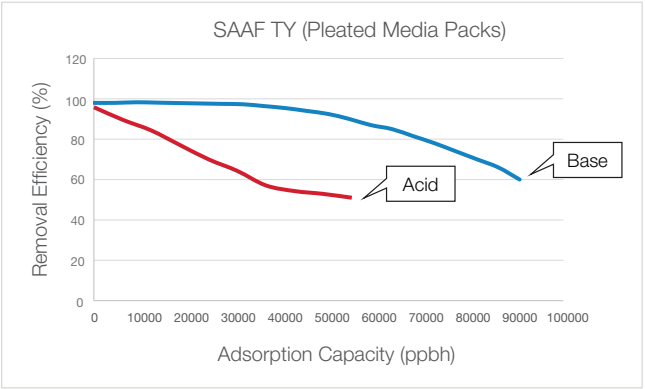
Specification

Housing Depth (mm)	610
Media Type	Carbon, Impregnated Carbon, Chemical, Blended, Ion Exchange Resin
Frame Material	Powder Coated Galvanised Steel
Gasket Sealant	Neoprene
Header Type	None Header
Target Gas	VOC, Acid, Base

Initial Resistance vs. Airflow



Removal Efficiency Curve



Product Information

Actual Size mm (W x H x D)	Housing Material	Media Material	Media Type
610 x 610 x 610 305 x 610 x 610	GI	Carbon Tray Filter	SAAFCarb
			SAAFCarb MA
			SAAFCarb MB
			SAAFOxidant
			SAAFBlend GP
			SAAFBlend CC
			SAAFBlend WS
		Pleated Media Packs	Activated Carbon (AC)
			Impregnated Activated Carbon (IAC)
			Ion Exchange Resin (IER))

VariSorb CE

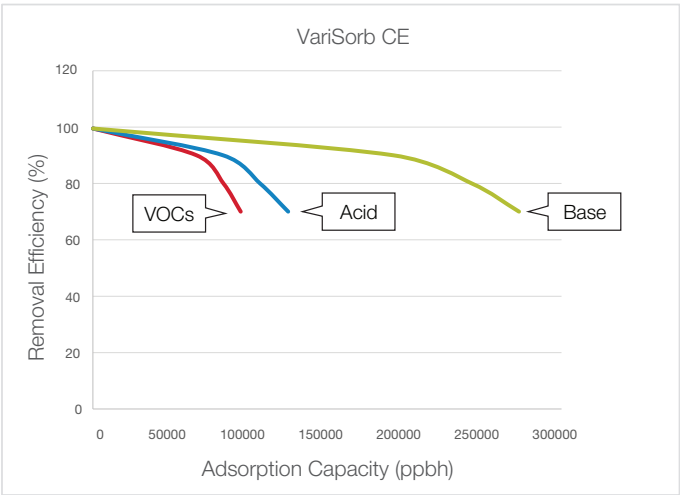
Product Overview

- Suitable for cleanroom environment
- Multi-layer pleated media for single or multiple gases
- High adsorption capacity and high removal efficiency
- No dust and no out-gassing properties
- Easy to install
- Energy efficient
- Low pressure drop
- ISO Class 6 Cleanliness Class
- Mini carbon granules embedded between two non-woven synthetic layers

Specification

Filter Depth (mm)	50 - 100
Media Type	Carbon, Impregnated Carbon, Ion Exchange Resin
Frame Material	Aluminium, Galvanised Steel, Stainless Steel
Gasket Sealant	EPDM, PU
Special Size Available	Yes
Header Type	None Header
Target Gas	VOC, Acid, Base
Recommended Operating Temperature	10 - 40°C
Recommended Relative Humidity	30 - 70%

Removal Efficiency Curve



Gas Turbine Solutions

AmerNet

Product Overview

- Effective droplet capture
- Washable design, low maintenance
- Low pressure loss
- Long filter life
- Lightweight, easy to install

Specification

Filter Depth (mm)	45
Media Type	Aluminium
Frame Material	Aluminium
Recommended Final Resistance	450 Pa
Max Operating Temperature	-32°C to +70°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AmerNet	24 x 24 x 2	595 x 595 x 45	3,400	75

AmAir 300 GT

Product Overview

- Prefilter with high arrestance and DHC
- Beverage board for highest moisture resistance
- Extends life of final filter

Specification

EN779	G4
Filter Depth (mm)	95
Media Type	Synthetic
Frame Material	Moisture Resistant Beverage Board
Recommended Final Resistance	250 Pa
Max Operating Temperature	90°C
Certification	UL 900

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AmAir 300 GT	24 x 24 x 4	594 x 594 x 95	4,250	90

AmerShield / SP

Product Overview

AmerShield

- Ideal pleat geometry for maximum service life
- Very low airflow resistance for increased turbine output
- Moisture-proof, thermally bonded synthetic media
- Lightweight for easy removal and installation
- Versatile product suitable for coastal or high-moisture installations

AmerShield SP

- Free moisture removal
- Low pressure drop
- Long service life
- Economical
- Lightweight

Specification

EN779	G4
ASHRAE 52.2	MERV 8
Filter Depth (mm)	48 - 150
Media Type	Fibreglass, Synthetic
Gasket	Optional
Sealant	Polyurethane
Recommended Final Resistance	450 Pa
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Media	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
AmerShield[1]	Fibreglass	24 x 24 x 2	592 x 592 x 48	4,250	115
		24 x 24 x 3	592 x 592 x 76		
		24 x 24 x 4	592 x 592 x 96		70
		24 x 24 x 6	592 x 592 x 150		
AmerShield SP[2]	Synthetic	24 x 24 x 2	592 x 592 x 48	3,400	55
				4,250	80
		24 x 24 x 4	592 x 592 x 96	3,400	50
				4,250	75
		24 x 24 x 6	592 x 592 x 150	3,400	45
				4,250	70

[1] *Max Operating Temperature -40°C to + 65°C.*
[2] *Max Operating Temperature 70°C.*

AmerGuard

Product Overview

- High dust-holding capacity
- Moisture resistant
- Long filter life
- Low pressure drop
- Durable construction

Specification

EN779	G4, M5, F7
Filter Depth (mm)	330, 650
Media Type	Synthetic
Frame Material	Plastic, Metal
Recommended Final Resistance	450 Pa
Burst Strength	> 5,000 Pa
Max Operating Temperature	80°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
G4				
AmerGuard	24 x 24 x 13	592 x 592 x 330	3,400	35
	24 x 24 x 26	592 x 592 x 650		40
M5				
AmerGuard	24 x 24 x 13	592 x 592 x 330	3,400	60
	24 x 24 x 19	592 x 592 x 480		50
	24 x 24 x 26	592 x 592 x 650		70
F7				
AmerGuard	24 x 24 x 26	592 x 592 x 650	3,400	90
				95

DuraCel

Product Overview

- Well suited in industrial applications
- Heavy duty construction
- High dust holding capacity
- Long filter life
- Low pressure drop

Specification

EN779	M6 - F8
ASHRAE 52.2	MERV 11 - 14
Filter Depth (mm)	292
Media Type	Fibreglass
Frame Material	Galvanised Steel
Gasket	Optional
Recommended Final Resistance	450 Pa
Max Operating Temperature	-32°C to +70°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11				
DuraCel XL60	24 x 24 x 12	594 x 594 x 292	3,400	125
DuraCel XL60N				140
F7 / MERV 13				
DuraCel XL90	24 x 24 x 12	594 x 594 x 292	3,400	170
F8 / MERV 14				
DuraCel XL90N	24 x 24 x 12	594 x 594 x 292	3,400	160

HydroCel

Product Overview

- Ideal for offshore environments
- Salt and moisture protection
- Eliminate frequent water washing
- Reduce downtime
- Increase production efficiency

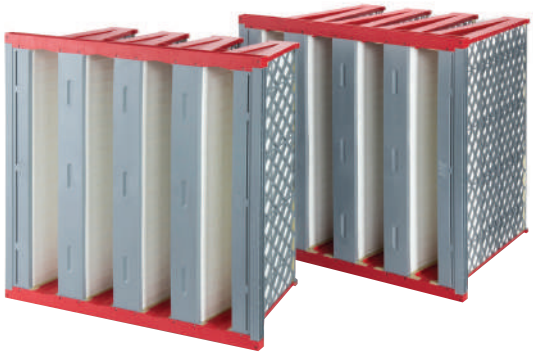
Specification

EN779	F8
ASHRAE 52.2	MERV 14
EN1822	E10, E12
Filter Depth (mm)	292
Media Type	Water and Oil Resistant Fibreglass
Frame Material	Plastic
Gasket Material	PU
Sealant	Polyurethane
Burst Strength	> 6,000 Pa
Recommended Final Resistance	625 Pa
Max Operating Temperature	-32°C to + 70°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F8 / MERV 14				
HydroCel H95	24 x 24 x 12	592 x 592 x 292	4,250	215
E10				
HydroCel E10	24 x 24 x 12	592 x 592 x 292	4,250	315
E12				
HydroCel E12	24 x 24 x 12	592 x 592 x 292	3,400	395

DuraGT



Product Overview

- Protect engines with sustained particulate collection
- Media packs potted on all sides for a leakfree seal
- Corrosion-proof construction
- Protection screens for increased filter media stability and high burst pressure
- Quick and easy maintenance

Specification

EN 779	M6 - F9
ASHRAE 52.2	MERV 11 - 15
Filter Depth (mm)	292, 440
Media Type	Fibreglass
Frame Material	Plastic
Protection Screen	Plastic
Sealant	Polyurethane
Gasket	PU
Burst Strength	> 3,000 Pa
Recommended Final Resistance	450 Pa
Max Operating Temperature	70°C
Humidity Range	0 to 100% Relative Humidity

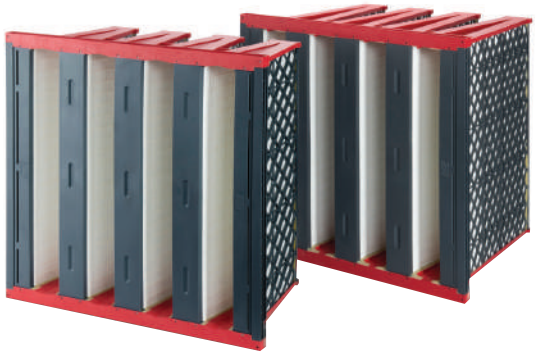
Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 11				
DuraGT V300	24 x 24 x 12	592 x 592 x 292	4,250	101
F7 / MERV 13				
DuraGT V300	24 x 24 x 12	592 x 592 x 292	4,250	113
F8 / MERV 14				
DuraGT V300	24 x 24 x 12	592 x 592 x 292	4,250	116
DuraGT V450	24 x 24 x 17	592 x 592 x 440		110
F9 / MERV 15				
DuraGT V300	24 x 24 x 12	592 x 592 x 292	4,250	143

HydroGT

Product Overview

- AAF's 'Hydro' series prevents water and salt ingestion
- Hydrocarbon and oil resistant
- High filtration efficiency
- Low differential pressure loss
- Quick and easy maintenance



Specification

EN779	F9
ASHRAE 52.2	MERV 15
EN1822	E10 - 12
Filter Depth (mm)	292, 440
Media Type	Water and Oil Resistant Fibreglass
Frame Material	Plastic
Protection Screen	Plastic
Sealant	Polyurethane
Gasket	PU
Burst Strength	> 7,000 Pa
Recommended Final Resistance	625 Pa
Max Operating Temperature	-32°C to + 70°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
F9 / MERV 15				
HydroGT V300	24 x 24 x 12	592 x 592 x 292	4,250	150
HydroGT V450	24 x 24 x 17	592 x 592 x 440		112
HydroGT V450+				
E10				
HydroGT V300	24 x 24 x 12	592 x 592 x 292	4,250	258
HydroGT V450	24 x 24 x 17	592 x 592 x 440		180
HydroGT V450+				178
E11				
HydroGT V450	24 x 24 x 17	592 x 592 x 440	4,250	180
HydroGT V450+				178
E12				
HydroGT V300	24 x 24 x 12	592 x 592 x 292	3,400	373
HydroGT V450	24 x 24 x 17	592 x 592 x 440	4,250	302
HydroGT V450+				294

DuraPak HydroPak

Product Overview

DuraPak

- Media options match application requirements
- Superior dust release properties
- Reverse pulse filter
- Low differential pressure
- Direct replacement into ASC filter housings

HydroPak

- Initial filtration efficiency at Most Penetrating Particle Size of >95
- Prevents salt and water ingestion
- Long filter life with low dP
- Direct replacement into ASC filter housings
- Inland and coastal based gas turbines

Specification

EN779	M6, F9
EN1822	E11
ASHRAE 52.2	MERV 10, 15
Filter Width - Larger End (mm)	244
Filter Width - Smaller End (mm)	165
Frame Material	Powder Coated Metal
Gasket Material	EPDM
Sealant	Polyurethane
Burst Strength	> 6,225 Pa
Max Operating Temperature	-40°C to + 65°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Media	Nominal Size Inches (H x D)	Actual Size mm (H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6 / MERV 10					
DuraPak B[1]	Blended	24 x 48	610 x 1220	2,550	262
F9 / MERV 15					
DuraPak BN	Blend Nano[2]	24 x 48	610 x 1220	2,550	290
DuraPak SN	Synthetic Nano[3]				308
E11					
HydroPak	Fibreglass	24 x 48	610 x 1220	2,550	296

[1]For efficiency class M6 refer to EN779:2012 & F8 refer to EN779:2002
[2]Blended substrate with nanofiber layer
[3]100 % synthetic with nanofiber layer

DuraShield B / BN

Product Overview

DuraShield B

- Suitable up to moderate dust levels
- Durable media
- High burst pressure
- Suitable for a wide number of geometries

DuraShield BN

- Excels in high dust load applications
- Effective pulse cleaning
- Increased compressor efficiency
- Longer filter life

Specification

EN779	M6[1], F9
ASHRAE 52.2	MERV 10, 15
Media Type	Blended, Blend Nano[2]
End Caps Material	Galvanised Steel
In / Outside Liner	Galvanised Steel
Gasket Material	EPDM
Sealant	Polyurethane
Burst strength	> 6,250 Pa
Max Operating Temperature	-40 °C to + 70 °C

Product Information

Model	Type	Outer Diameter (mm)	Length (mm)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
Conical & Cylindrical Set					
DuraShield B[1]	Conical	Ø 1: 444, Ø 2: 324	660	2,550	155
	Cylindrical	324			
Cylindrical Pair					
DuraShield B[1]	Cylindrical	405	560	3,254	268
			876		
Cylindrical					
DuraShield B[1]	Cylindrical	324	660	1,275	191
		405	876	1,989	145
Conical & Cylindrical Set					
DuraShield BN[3]	Conical	Ø 1: 444, Ø 2: 324	660	2,550	175
	Cylindrical	324			
Cylindrical Pair					
DuraShield BN[3]	Cylindrical	405	560	3,254	285
			876		
Cylindrical					
DuraShield BN[3]	Cylindrical	324	660	1,275	200
		405	876	1,989	155

[1]M6 to EN779:2012 & F8 to EN779:2002.
[2]Blended substrate with nanofiber layer.
[3]F9 to EN779:2012

DuraShield S / SN

Product Overview

DuraShield S

- Protects engines with sustained F9 (MERV 15) efficiency
- Excellent particle efficiency
- Excels in high humidity applications
- High dust holding capacity for greater life
- Reduced maintenance & operational costs

DuraShield SN

- Suitable in high dust load environements
- Effective pulse cleaning
- Reduced maintenance & operational costs

Specification

EN779	F9
ASHRAE 52.2	MERV 15
Filter Length (mm)	660
Media Type	Synthetic
End Caps Material	Galvanised Steel, Stainless Steel
In / Outside Liner	Galvanised Steel, Stainless Steel
Gasket Material	EPDM
Sealant	Polyurethane
Burst Strength	> 6,250 Pa
Max Operating Temperature	-40°C to + 70°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Type	Outer Diameter (mm)	Length (mm)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
Conical / Cylindrical Set					
DuraShield S	Conical	Ø 1: 444, Ø 2: 324	600	2,550	140
	Cylindrical	324			
Conical / Cylindrical Set					
DuraShield SN[1]	Conical	Ø 1: 444, Ø 2: 324	660	2,550	200
	Cylindrical	324			
Cylindrical Pair					
DuraShield SN[1]	Cylindrical	405	560	3,254	315
			876		
Cylindrical					
DuraShield SN[1]	Cylindrical	324	660	1,275	215
		405	876	1,989	148

[1]100% synthetic with nanofiber layer.

HydroShield

Product Overview

- Initial filtration efficiency at Most Penetrating Particle Size of >95 %
- Prevents salt and water ingestion
- Long filter life
- Low differential pressure loss
- Compatible with GDX systems

Specification

EN1822	E11
Filter Length (mm)	660
Media Type	Hydrophobic Microfiber
End Caps Material	Galvanised Steel
In / Outside liner	Galvanised Steel
Gasket Material	EPDM
Sealant	Polyurethane
Burst Strength	> 6,250 Pa
Max Operating Temperature	-40°C to + 65°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Part Number	Type	Outer Diameter mm	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
Conical / Cylindrical Set				
CU003	Conical	Outer Ø 1: 444, Outer Ø 2: 324	2,550	195
	Cylindrical	324		

AmerGuard HV

Product Overview

- Premium high velocity pre-filter
- High dust holding capacity
- Moisture resistant
- Low pressure drop
- Burst resistant

Specification

EN779	G3
Filter Depth (mm)	400
Media Type	Synthetic
Frame Material	Stainless Steel
Recommended Final Resistance	500 Pa
Burst Strength	> 5,000 Pa
Max Operating Temperature	80 °C
Humidity Range	0 to 100% Relative Humidity

Product Information

Part Number	Nominal Size Inches (W x H x D)	Actual Size mm (W x H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
EK101KC	25 x 23 x 16	620 x 578 x 400	7,650	98

AmerVane HV

Product Overview

- Premium high velocity droplet separator
- Specifically designed for offshore, coastal and marine GT applications
- Market-leading free moisture removal
- Low pressure drop
- Maintenance free

Specification

Vane Depth (mm)	65
Casing / Cassette Depth (mm)	75
Vane Profile	Aluminium
Vane Spacers	Plastic
Casing / Cassette Material	Stainless Steel
Max Operating Temperature	-40°C to +80°C

Product Information

Model	Fractional Efficiency @ 6 m/s	Rated Face Velocity (m/s)	Pressure Loss (Pa)
AmerVane HV	100% > 8 µm	6	98

N-hance / M6 Ventilation Filter

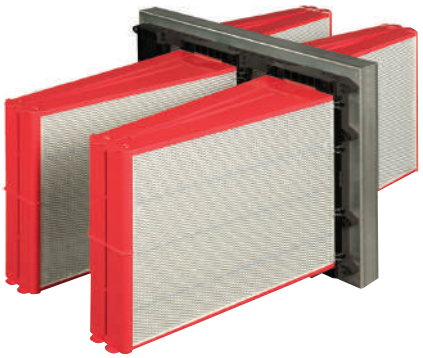
Product Overview

N-hance

- EPA E12 high velocity filtration
- Unique interlocking design
- Low differential pressure
- AAF's proprietary offshore media
- Simple internal retrofit

N-hance M6 Ventilation Filter

- Easy to identify
- Long filter life
- Low pressure loss
- Easy to install and replace



Specification

EN1822	M6, E12
Filter Depth (mm)	640
Media Type	Hydrophobic and Oleophobic Fibreglass
Frame Material	Plastic
Protection Screen	Stainless Steel
Sealant	Polyurethane
Gasket	Silicone & EPDM
Hardware and Clips	Stainless Steel
Recommended Final Resistance	500, 1,500 Pa
Burst Strength	> 6,225 Pa
Max Operating Temperature	-40°C to +60°C
Humidity Range	0 to 100% Relative Humidity

Product Information

Model	Nominal Size Inches (H x D)	Actual Size mm (H x D)	Rated Airflow (CMH)	Rated Initial Resistance (Pa)
M6				
N-hance	11 x 24 x 25	290 x 600 x 640	2,550	200
E12				
N-hance	11 x 24 x 25	290 x 600 x 640	2,550	390

**Maximum temperature for floating platforms and vessels is + 40°C | + 104°F.*

***Recommended Changeout Resistance could be higher up to 1,000 Pa or may have to be lower than 500 Pa and is dependent upon the capacity and duty of the ventilation fan.*

Environmental Solutions

RotoClone W

Product Overview

- The most cost-effective, high-efficiency wet dust collector in its class
- Combines a dust collector with a centrifugal fan suitable for a wide variety of different applications
- Provides continuous operation as no downtime for bag or cartridge changeout
- No secondary dust problem
- Suitable for explosive applications – including coal, food and chemical industries

Application

- Dryers
- Cookers
- Crushing
- Grinding
- Spraying (Pill coating, Ceramic glazing)
- Ventilation (Bin vents, Dumping operations)
- Transfer stations
- Mixing
- Dumping
- Packaging

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Outlet (Standard)	Straight
Outlet (Optional)	Elbow, Centrifugal
Food Quality Features	Optional
High Temperature Construction	Optional
Explosive Certified (Optional)	ATEX/NFPA
HEPA/ASHRAE Filters and Housings	Optional

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	Water Supply Rate (LPH)		
			2.75 Bar	3.45 Bar	4.14 Bar
8	1099 x 837 x 1013	102	250	273	295
10	1314 x 1014 x 1254	163	340	364	409
12	1475 x 1225 x 1551	285	409	454	500
14	1599 x 1390 x 1752	450	523	568	659
16	1689 x 1603 x 2013	572	795	886	977
20	2062 x 1970 x 2492	735	1,022	1,136	1,250
24	2411 x 2389 x 2981	858	1,363	1,522	1,659
27	2648 x 2648 x 3340	1,348	1,704	1,908	2,090
30	2824 x 2889 x 3696	1,756	1,818	2,022	2,227
33	3085 x 3196 x 4445	2,205	2,727	3,045	3,340
36	3330 x 3435 x 4445	2,654	3,181	3,567	3,885
45	3697 x 4196 x 5484	6,125	5,000	5,589	6,112

**Weight doesn't include motor and drive.*

RotoClone N

Product Overview

- Combines high efficiency with low water usage to maximise performance
- Flexible design for a wide range of operating conditions with minimal servicing requirements
- Designed for continuous operation with minimum service
- Low water usage

Application

- Chemical
- Rock products
- Metalworking
- Mixing
- Shot blasting
- Drying
- Mining
- Coal

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Sludge Removal (Standard)	Manual
Sludge Removal (Optional)	Automatic, Continuous
High Temperature Construction	Optional
Explosive Certified (Optional)	ATEX/NFPA
Other Dimension Available	Yes

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	Water Supply Rate (LPM)
			1.39 Bar
1.5	1308 x 2680 x 1216	725	1.89
2.5	1308 x 2680 x 1216	770	1.89
4	1384 x 2781 x 1654	1,040	1.89
6	1588 x 3010 x 2257	1,360	1.89
8	2013 x 4254 x 2318	1,905	1.89
12	2622 x 4661 x 2318	2,400	1.89
16	3232 x 4762 x 2318	3,265	1.89
20	3841 x 4762 x 2318	3,674	3.79
24	4651 x 5271 x 2521	4,580	3.79
28	5061 x 5471 x 2521	5,340	3.79

**Manual sludge removal model.*

OptiFlo RC

Product Overview

- Dry dust collector with modular design that able to handle a wide range of airflows
- Requires minimal footprint
- Reduces the emissions generated by a large variety of applications and processes
- Easy and quick cartridge replacement procedure
- Lower operating costs

Application

- Industrial process
- Food processing
- Metalworking
- Pharmaceutical
- Woodworking

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Efficiency	99.99% for particle larger than 0.5 µm
Filter Class	MERV 11, 15
Pulse System Controller	REDClean GammaPulse
Explosion Protection (Optional)	Explosion Vent, Sprinkler System
Discharge Devices (Standard)	Bin
Discharge Devices (Optional)	Airlock, Screw Conveyor
Access Platform and Ladder	Optional
Abrasive Dust Inlet	Optional
Cartridge and Bin BIBO	Optional
Fan with Damper	Optional
Other Dimension Available	Yes

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	No. of Catridge
2RC4	1015 x 3043 x 1497	481	4
3RC6	1015 x 3513 x 1497	583	6
2RC8	1015 x 3645 x 2217	718	8
2RC16	2030 x 3645 x 2217	1101	16
2RC24	3045 x 3645 x 2217	1462	24
2RC32	4060 x 3645 x 2217	2075	32
2RC40	5075 x 3645 x 2217	2447	6
3RC12	1015 x 4115 x 2217	860	12
3RC24	2030 x 4115 x 2217	1346	24
3RC36	3045 x 4115 x 2217	1810	36
3RC48	4060 x 4115 x 2217	2528	48
3RC60	5075 x 4115 x 2217	3001	60
3RC72	6090 x 4115 x 2217	3477	72
4RC16	1015 x 4585 x 2217	993	16
4RC32	2030 x 4585 x 2217	1573	32
4RC48	3045 x 4585 x 2217	2132	48
4RC64	4060 x 4585 x 2217	2948	64
4RC80	5075 x 4585 x 2217	3517	80
4RC96	6090 x 4585 x 2217	4086	96
4RC112	7105 x 4585 x 2217	4902	112
4RC128	8120 x 4585 x 2217	5466	128

**Height is based on standard hopper.*
***Weight doesn't include any accessories such as fan or controller.*

OptiFlo MiniPulse

Product Overview

- Cartridge dry dust collector with compact design for small industrial applications
- Plug & Play solution that is small, light and easy to handle
- Flexible in adapting to the customer's needs and the application in which it is used

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Filter Class	MERV 11, 15
Pulse System Controller	REDClean GammaPulse
Discharge Devices (Optional)	Hopper and Bin
Fan & Motor	Yes
Explosive Certified	ATEX

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	No. of Catridge	Rated Airflow (CMH)
2.2 Model V*	632 x 412 x 494.5	37 (Non-ATEX), 42 (ATEX)	1	440
2.2 Model M**	632 x 412 x 766	37 (Non-ATEX), 42 (ATEX)	1	440
4.4 Model V*	632 x 412 x 719.5	37 (Non-ATEX), 42 (ATEX)	1	1,000
4.4 Model M**	632 x 412 x 1021	37 (Non-ATEX), 42 (ATEX)	1	1,000

**Model without fan.*
***Model with built-in fan.*

OptiFlo Compact HB6000

Product Overview

- High efficiency air filtration and purification system with two stage filtration
- Ideal for strictly controlling the air circulating in the most sensitive environments
- Plug & Play solution enables a quick start-up with minimal maintenance and an intuitive and easy operation
- Includes a Bag In-Bag Out system that allows changing filters is safe for the operator as well as the environment

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Filter Class	F9 & H14
Pulse System Controller	REDClean GammaPulse
BIBO	Yes
Fan & Motor	Yes

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	No. of Catridge	No. of HEPA Filters	Rated Airflow (CMH)
OptiFlo Compact HB6000	2091 x 2096 x 1822	738	4	2	6,000

OptiFlo Compact

Product Overview

- Dry dust collector with modularity in design that able to handle a wide range of flows
- Plug & Play design that has a built-in fan and electrical panel and incorporates its own dust discharge and collection system
- Longer operating life of the unit and the cartridges
- Reduction in required maintenance
- Lower operating costs

Application

- Emptying / Filling of Supersacks
- Welding
- Laser / Plasma Cutting
- Shot Blasting
- Grinding / Polishing / Deburring
- Mixing
- Weighing
- Drying
- Dry Paint Booth
- Conveyors Transfer
- Pneumatic Transport

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Efficiency	99.99% for particle larger than 0.5 µm
Filter Class	MERV 11, 15
Pulse System Controller	REDClean GammaPulse
Explosion Protection (Optional)	Explosion Vent
Explosive Certified (Optional)	ATEX, NFPA 654 and 68
Spark Arrestor	Optional

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)	No. of Catridge	Rated Airflow (CMH)
2RC4	1155 x 2388 x 1748	667	4	2,000 - 6,000
3RC6	1155 x 2858 x 1748	792	6	2,000 - 6,000
2RC8	1155 x 2680 x 2468	884	8	2,000 - 12,500
3RC12	1155 x 3150 x 2468	1,052	12	2,000 - 23,750
4RC16	1155 x 3620 x 2468	1,233	16	2,000 - 23,750

**Height and weight can increase depending on selected features.*
***Airflow will depend on selected motor and dust type.*

FabriPulse Fusion

Product Overview

- Optimum solution to a variety of air quality problems
- Design optimisation in conjunction with AAF class-leading range of engineered synthetic fabric bags
- Flexible and modular design that reduces freight and installation costs
- Quick installation & ease of maintenance
- Low pressure drop to reduce the cost of ownership
- Robust construction for a consistent and reliable performance level

Application

Bulk material production, handling and processing

- Metals production: Furnaces, melting, casting, molding
- Woodworking: Cutting, milling, routing, sanding
- Mining and ore production including stone and minerals quarrying and processing:
- Crushing
- Cement and gypsum production
- Plastics manufacturing
- Carbonaceous materials: Coal, coke, charcoal, carbon black
- Food, salt and organic food processing
- Biomass

Nuisance Venting

- Conveying
- Transfer points
- Filling and packaging

Specification

Main Structure Material	Carbon Steel, Stainless steel
Media Type	Polypropylene, Polyester, Acrylic, Fibreglass, Nomex, PTFE
Pulse System Controller	REDClean GammaPulse
Explosion Protection (Optional)	Explosion Vent, Sprinkler System
Discharge Device (Standard)	Bin
Discharge Devices (Optional)	Airlock, Screw Conveyor
Access Platform and Ladder	Optional
Abrasive Dust Inlet	Optional
Fan with Damper	Optional
Other Dimension Available	Yes

Product Information

Model	Housing Dimension mm (W x H x L)	Total Weight (kg)
12-88	2573 x 8876 x 1810	2027
12-96	2573 x 8876 x 1810	2504
12-132	2573 x 8876 x 2570	3152
12-144	2573 x 8876 x 2570	3208
12-176	2573 x 8876 x 3330	3877
12-192	2573 x 8876 x 3330	3951
12-220	2573 x 8876 x 4090	4570
12-240	2573 x 8876 x 4090	4663
12-264	2573 x 8876 x 4850	5256
12-288	2573 x 8876 x 4850	5368
12-308	2573 x 8876 x 5610	5980

**Height and weight can increase depending on selected features.*
***Airflow will depend on selected motor and dust type.*

FabriPulse Evolution

Product Overview

- Optimum solution to a variety of air quality problems
- Design optimisation in conjunction with AAF class-leading range of engineered synthetic fabric bags
- Flexible and modular design that reduces freight and installation costs
- Quick installation & ease of maintenance
- Low pressure drop to reduce the cost of ownership
- Robust construction for a consistent and reliable performance level

Application

- Conveyors
- Air Slides
- Elevators
- Silos
- Loading Hoppers
- Channels
- Eco-hoppers
- Pneumatic Conveyors

Specification

Main Structure Material	Carbon Steel, Stainless steel
Media Type	Polypropylene, Polyester, Acrylic, Fibreglass, Nomex, PTFE
Pulse System Controller	REDClean GammaPulse
Fan & Motor	Yes
Noise Reduction (Optional)	Soundproof Cabin
Explosive Certified (Optional)	ATEX

Product Information

Model	Housing Dimension mm (W x H x L)	Total Weight (kg)	No. Sleeves
4-700	580 x 1075 x 1233	181	4
4-1000	580 x 1075 x 1233	185	
4-1250	580 x 1075 x 1233	187	
4-1500	580 x 1075 x 1233	190	
20-700	1200 x 2630 x 1430	350 - 365	20
20-1000	1200 x 2630 x 1430	360 - 415	
20-1250	1200 x 2630 x 1430	380 - 420	
20-1500	1200 x 2630 x 1430	545 - 642	
20-1750	1200 x 2630 x 1430	570 - 670	
20-2000	1200 x 2208 x 1430	601 - 699	
30-700	1200 x 1430 x 2808	625 - 660	30
30-1000	1200 x 1430 x 2808	647 - 745	
30-1250	1200 x 1430 x 2808	665 - 765	
30-1500	1200 x 1430 x 2808	704 - 804	
30-1750	1200 x 1430 x 2808	740 - 840	
30-2000	1200 x 1430 x 2808	788 - 885	
40-1000	1200 x 1430 x 3333	825 - 915	40
40-1250	1200 x 1430 x 3333	850 - 940	
40-1500	1200 x 1430 x 3333	905 - 990	
40-1750	1200 x 1430 x 3333	950 - 1040	
40-2000	1200 x 1430 x 3333	1010 - 1105	

**Seven sizes are available for filtering areas ranging between 4m^2 and 80m^2.*

*** Six bag lengths are available based on the filtering needs and characteristics of the available space.*

FabriPulse M

Product Overview

- Optimum solution to a variety of air quality problems
- Compact design utilises unique, small diameter filter bags with built-in venturis and expanders into a small place
- Flexible and modular design that reduces freight and installation costs
- Removable cassettes ensure quick and easy changeover with minimum downtime and disruption
- Low pressure drop to reduce the cost of ownership
- Robust construction for a consistent and reliable performance level

Application

- Metalworking
- Woodworking
- Industrial process
- Food processing
- Pharmaceutical

Specification

Main Structure Material	Carbon Steel, Stainless Steel
Media Type	Polypropylene, Polyester, Acrylic, Fibreglass, Nomex, PTFE
Pulse System Controller	REDClean GammaPulse
Outlet	Side Outlet, Top Outlet
Explosion Protection (Optional)	Explosion Vent, Sprinkler System
Discharge Devices (Optional)	Airlock, Screw Conveyor
Access Platform and Ladder	Optional
Abrasive Dust Inlet	Optional
Fan with Damper	Optional
Other Dimension Available	Yes

Product Information

Model	Housing Dimension mm (W x H x L)	Appox. Weight (kg)
4-84	868 x 4315 x 1777	686
4-168	1413 x 4315 x 1777	929
4-252	2118 x 4370 x 1777	1,229
4-336	2663 x 4730 x 1777	1,507
4-420	3368 x 4730 x 1777	1,807
6-84	868 x 4924 x 1777	764
6-168	1413 x 4924 x 1777	1,035
6-252	2118 x 5339 x 1777	1,359
6-336	2663 x 5339 x 1777	1,672
6-420	3368 x 5339 x 1777	1,981

**Other arrangement and top outlet dimemsion are available.*
***Approx weight is based on standard option.*

Glossary of Terms

Filtration Glossary of Terms

Organizations

ABNT Brazilian Association of Technical Standards
ABSA Animal Biological Safety Association
ACS American College of Surgeons
AFNOR French Standardization Association
AIA American Institute of Architects
ANSI American National Standards Institute
ANVISA Brazilian Health Regulatory Agency
APHIS Animal & Plant Health Inspection Services
ARS Agricultural Research Service
AS/NZS Australian New Zealand Standards
ASHP Pharmaceutical Compounding Sterile Preparations
ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
ASTM American Society for Testing and Materials

BMBL Biosafety in Microbiological and Biomedical Laboratories
BSI British Standards Institute
BSL Biological Safety Association

Cal/OSHA California Division of Occupational Safety and Health (California OSHA)
CDC Centers for Disease Control and Prevention (a Federal agency)
CDER Center for Drug Evaluation and Research
CFDA China Food and Drug Administration
CITC Curry International Tuberculosis Center
CMC California Mechanical Code

EMA European Medicines Agency
EPA Environmental Protection Agency

FDA US Food and Drug Administration (a Federal agency)

HPRA Health Products Regulatory Authority
ICC International Code Council
ISO International Standards Organization (29463,14644 filter & cleanroom norms)
ISPE International Society of Pharmaceutical Engineers
ITRS International Technology Roadmap for Semiconductors

JACA Japan Air Cleaning Association
JCAHO Joint Commission on Accreditation of Healthcare Organizations
JCI Joint Commission International (accreditation)
JSA Japanese Standards Association

MHRA Medicines and Healthcare Products Regulatory Agency (UK)
MMWR Morbidity and Mortality Weekly Report

NACMCF National Advisory Committee on Microbiological Criteria for Foods
NEBB National Environmental Balancing Bureau
NFPA National Fire Protection Association
NIH National Institute of Health
NIOSH National Institute for Occupational Safety and Health (a Federal agency)
NOM Official Mexican Standards
NSF National Sanitation Foundation

OECA Office of Enforcement and Compliance Assurance (EPA)
OSHA Occupational Safety and Health Administration (a Federal agency)
OSHPD Office of Statewide Health Planning and Development (a California agency)

PDA Parental Drug Association
PHSS Pharmaceutical & Healthcare Sciences Society
PICS Pharmaceutical Inspection Convention & Co-operation Scheme

SEMI Semiconductor Equipment and Materials International

TGA Therapeutic Goods Administration (Australia)
TPD Therapeutic Products Directorate (Canada)

US DOD Department of Defense
US DOE Department of Energy
US DOH Department of Health
USDA United States Department of Agriculture
USP United States Pharmacopeial Convention

VDI Association of German Engineers

WHO World Health Organization

Filtration Glossary of Terms

Terms

ACH	Air Changes per Hour
AFB	Acid-Fast Bacilli
AHJ	Authority Having Jurisdiction
AHU	Air Handling Unit
AIDS	Acquired Immunodeficiency Syndrome
AIIR	Airborne Infection Isolation Room
AMC	Airborne Molecular Contamination
AMHSs	Automated Material Handling Systems
APC	Aerodynamic Particle Counter
API	Active Pharmaceutical Ingredient
aRABs	Active Restricted Access Barrier System
BACnet	Building Automation Control networking protocol
BAMT	Blood Assay for Mycobacterium Tuberculosis
BAS	Building Automation System
BCG	Bacille Calmette-Guérin (vaccine)
BI	Biological Indicators
BIBO	Bag In Bag Out
BMS	Building Management System
BOD	Basis of Design
BSC	Biological Safety Cabinet
C&Q	Commissioning & Qualification
CAV	Constant Air Volume
CFD	Computational Fluid Dynamics
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulation
CFUs	Colony Forming Units
CGMP	Current Good Manufacturing Practice
CHW	Chilled water
CIP	Clean In Place
CMD	Count Mean Diameter
CMMS	Computerized Maintenance Management System
CNC	Controlled Not Classified
COSHH	Control of Substances Hazardous to Health
CPC	Condensation Particle Counter
CPU	Central Processing Unit
cRABs	Closed Restricted Access Barrier System
CRR	Contamination Recovery Rates
CVCM	Collected Volatile Condensable Material
DFW	Downflow Booth
DIW	Deionized Water
DOT	Directly Observed Therapy
DPC	Discrete Particle Counter
DQ	Design Qualification
DRAM	Dynamic Random Access Memory
DUV	Deep Ultraviolet
ECM	Engineering Change Management
EM	Environmental Monitoring
EMI	Electromagnetic Interference
EMS	Energy Management System
EN	1822 European Norm for Air Filter Testing Parts 1-5
ESD	Energy Saving Damper
ESD	Electrostatic Discharge
FAMU	Fresh Air Make Up
FAT	Factory Acceptance Test
FFU	Fan Filter Unit
FOUP	Front Opening Unified Pod
FPD	Flat Panel Display
FPM	Feet Per Minute
FRM	Fluoro-Resin-Media
FRS	Functional Requirement Specification
GCHW	Glycol Chilled Water
GEP	Good Engineering Practice
GIP	Gassing In Place
GLP	Good Laboratory Practice
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Points
HCW	Healthcare Worker
HEPA	High Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
HMI	Human Machine Interface
HPC	Highly Potent Compound
HSC	Health & Safety Commission (UK)
HSE	Health & Safety Executive (UK)
HVAC	Heating, Ventilating, and Air Conditioning
IAQ	Indoor Air Quality
ICP	Infection Control Plan
IDLH	Immediately Danger to Life and Health
IGRA	Interferon Gamma Release Assay
IIoT	Industrial Internet of Things
INH	Isoniazid
IoT	Internet of Things
IQ	Installation Qualification
LAF	Laminar Flow
LCC	Life Cycle Cost
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEV	Local Exhaust Ventilation
LLF	Light Loss Factor
LTBI	Latent Tuberculosis Infection
LUX	Light (Latin)

Filtration Glossary of Terms

Terms

M.tb Mycobacterium Tuberculosis
MA Molecular Acids
MALs Material Air Locks
MB Molecular Bases
MC Molecular Condensable (Organic Compounds)
MCP Microbial Carrying Particles
MD Molecular Dopants
MDR Multidrug-Resistant
MPPS Most Penetrating Particle Size
MTBF Mean Time Between Failures
MTP Material Transfer Port
MUA Make Up Air

NAAT Nucleic Acid Amplification Test
NTM Nontuberculous Mycobacteria
NTT No Touch Transfer
NVR Non Volatile Residue

OAQ Outdoor Air Quality
OEB Occupational Exposure Bands
OEL Occupational Exposure Limit
OPC Optical Particle Counter
OPS Operations Performance Systems
OQ Operational Qualification
OSD Oral Solid Dosage

PALs Personnel Air Locks
PCW Process Chilled Water
PE Particle Exhaust
PEH Heat Exhaust
PEV VOC Exhaust
PFC Power Factor Correction
PIN Policy Intent Notice
PLC Programmable Logic Control
POG Point of Generation
POU Point of Use
PPD Purified Protein Derivative
PPE Personal Protection Equipment
PQ Performance Qualification
PTFE Poly-Tetra-Fuoro-Ethylene
PUPSIT Preuse Post Sterilization Integrity Testing

QFT-G QuantiFERON®-TB Gold blood test
QRM Quality Risk Management

RABs Restricted Access Barrier System
RAH Recirc Air Handling Unit
REL Recommended Exposure Limits
RFU Recirc Fan Unit
RIPT Respiratory Isolation of Pulmonary Tuberculosis
RTMCC Regional Training and Medical Consultation Center
RTP's Rapid Transfer Ports

SAL Sterility Assurance Level
SAT Site Acceptance Test
SBV's Split Butterfly Valves
SEM Scanning Electron Microscope
Sensor360® IAQ sensor technology that measures PM and PD levels to optimize filter life and performance.
SIP Sterilize In Place
SME Subject Matter Expert
STEL Short Term Exposure Limit
SUP Supply Air Categories

TB Tuberculosis
TCOD Total Cost of Ownership Diagnostic® Software
TFT Thin Film Transistor
TLV Threshold Limit Values
TOC Total Organic Compound
TST Tuberculin Skin Test
TVOCs Total Volatile Organic Compounds

UDF Unidirectional Down-Flow Hood
UPS Uninterrupted Power Supply
UPW Ultrapure Water
URS User Requirement Specification
UV Ultraviolet
UVGI Ultraviolet Germicidal Irradiation

VAV Variable Air Volume
VCM Volatile Condensable Material
VFD Variable Frequency Drive
VHP Vaporized Hydrogen Peroxide (H_2O_2)
VLF Vertical Laminar Flow
VMP Validation Master Plan VO-Voltage Optimization
VOC Volatile Organic Compound
VO Voltage Optimization
VSD Variable Speed Drives
VUs Viable Units

"W.G." Inches of Water Gauge

XDR Extensively Drug-Resistant

Filtration Industry Definitions

ABSOLUTE – An arbitrary term once used to describe high efficiency particulate air filters, based on minimal penetration of 0.3 micron particles. In air filtration, there are no absolutes.

ABSOLUTE FILTER – This term has been applied to air filters of high efficiency—greater than 95% against submicron particles—but is now less frequently used. Modern terminology prefers the term HEPA filter (High Efficiency Particulate Air).

ABSORB – To intercept, or drink in, as a sponge sucks in water.

ABSORPTION – A physio-chemical process in which one substance associates with another to form a homogeneous mixture that presents the characteristics of a solution.

ACFM – Actual Cubic Feet Per Minute. Airflow measured at operating temperature and pressure.

ACID – Any of a class of substances whose aqueous solutions are characterized by a sour taste, the ability to turn blue litmus to red, and the ability to react with bases and certain metals to form salts. Acids will yield hydrogen ions when dissolved in water.

ACTIVATED ALUMINA – A highly porous and granular form of aluminum oxide having preferential adsorptive capacity for moisture from gases, vapors, and some liquids.

ACTIVATED CARBON – Any form of carbon characterized by high adsorptive capacity for gases, vapors, or colloidal solids. The carbon or charcoal is produced by destructive distillation of wood, peat, lignite, nut shells, bones, vegetable, or other carbonaceous matter, but must be activated by high temperature steam or carbon dioxide, which creates a porous particle structure.

ACTIVATED CHARCOAL – See activated carbon.

ADHESION – Intermolecular forces which hold matter together. Also applied to the sticking together of a particle to a surface, a fiber or another particle. The main factors affecting adhesion of particles are 1) London-van der Waals forces, which are electrical in origin, 2) electrostatic forces, and 3) surface tension, due to films of moisture on particles or on the surface. Other factors influencing adhesion are the nature of the surfaces, surface contaminants, particle size, shape and roughness, and time of contact.

ADSORB – The physio-chemical phenomenon involved to attract and hold a gas, vapor, or liquid on the surface of a solid, particularly on a finely divided material.

ADSORBATE – The material which is adsorbed; i.e., the gas, vapor, or liquid which adheres, or is chemically attracted to, the surface of the solid.

ADSORBENT – The material which adsorbs; i.e., the solid which attracts and holds on its surface the gas, vapor, or liquid. Activated carbon and activated alumina are all adsorbents

ADSORPTION – The natural phenomenon of a gas, vapor, or liquid being attracted to, and held on, the surface of a solid. To some extent, adsorption takes place on any solid surface, but certain materials have sufficient adsorbent capacity because they are finely divided and are therefore useful in such industrial applications as the purification and separation of gases and liquids.

AEROSOL – Liquid or solid particles suspended in air, gas, or vapor.

AHRI – Air-Conditioning, Heating, and Refrigeration Institute.

ALKALI – A term that applies to the type of compounds which have basic properties and will neutralize acids. Some alkaline materials are hydroxides, carbonates, or caustics.

AMBIENT – Of the surrounding area or environment.

AMBIENT AIR – The air surrounding a building. The source of outdoor air brought into a building.

AMINE – A class of organic compounds of nitrogen that may be considered to be derived from ammonia. It may be a gas, liquid, or solid. All amines are basic in nature and will usually combine readily with hydrochloric or other strong acids to form salts.

AMMONIA – A colorless gas with a characteristic pungent odor. Used for refrigeration, fertilizer, chemical manufacturing, and many other uses.

ANGSTROM – A unit of length, 10-10 meter, or one ten thousandth of a micron.

ANSI – American National Standards Institute.

ARRESTANCE – A measure of the ability of an air-cleaning device to remove ASHRAE loading dust from test air. Measurements are made of the weight of loading dust fed and the weight of the dust passing the device during loading. The difference between the weight of dust fed and the weight of dust passing the device is calculated as the dust captured by the device. Arrestance is then calculated as the percentage of the dust fed that was captured by the device.

AROMATIC COMPOUNDS – Compounds related to six-carbon membered rings as benzene or its derivatives.

ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers.

ASHRAE LOADING DUST – Loading dust for testing air filtration devices composed, by weight, of 72% SAE Standard J726 test dust (fine), 23% powdered carbon, and 5% milled cotton linters.

ASME – American Society of Mechanical Engineers.

ATMOSPHERIC PRESSURE – The pressure of approximately 14.7 pounds per square inch exerted at sea level in all directions by the atmosphere.

BIOAEROSOL – A suspension of airborne particles that contain living organisms or were released from living organisms.

BLEEDTHRU – The term bleedthru was a phrase coined by industry professionals when multiple filters (normally installed in a Grade A space) were exposed to a thermal ('hot smoke') challenge aerosol. The filters installed had excessive penetration through the media, hence the term 'bleedthru'.

A lot has been written about this topic including from 'not thick enough media' to 'we must now use ULPA filters' but the issue and 'fix' can be summarized below.

The three main factors to be aware of are:

1. Higher than expected or design velocity (We should look at effective filter area not the nominal frame size)
2. Challenge aerosol type. ('Hot' smoke mean particle size can be close to the MPPS)

Filtration Industry Definitions

3. Filter Specification. (The traditional 99.99 at 0.3 micron can 'fail' a scan test when exposed to a thermally generated aerosol especially at higher than design or factory tested velocity in the field)

How to solve the problem:

1. Understand the actual media face velocity when selecting/specifying filters. A nominal '4x2' or 1200x600 filter can be as high as 20% smaller when installed in a given housing or ceiling grid therefore increasing the actual face velocity which can contribute to higher penetration values. Most filter manufactures test filters at 120 fpm or 0.6 m/s to minimize risk. Some older facilities due to the specific site design have higher than recommended filter face velocities. Filters can be manufactured to perform at elevated velocities if known ahead of time. The only negative of course is the penalty paid in a higher energy cost due to the increased pressure drop. (Membrane eFRM media can reduce DP substantially in these applications)
2. Understand where possible how your filters are being tested. A 'hot smoke' (thermal) has a higher penetration than 'cold smoke' (Laskin Nozzle) in the field as stated above.
3. To minimize risk, specify filters with an efficiency of H14 (99.995) at MPPS in accordance with EN-1822 or Type K (99.995) at 0.1-0.2 micron in accordance with IEST CC001. The leakage factor for the H14 filter should be 1.6 (Type K) instead of 5, therefore giving a maximum penetration of 0.008% assuming a standard velocity of 120 fpm or 0.6 m/s.

It's important all parties involved from the end user, specifier, certifier and filter vendor understand the site specific variables. Again, filter efficiency specified, actual on site HEPA media velocity, and the equipment and specification of how filters are tested both in the factory and field.

BLIND SPOTS – Places in a medium where no filtering occurs. These places are also referred to as dead areas and are the opposite of the effective area.

BREAKTHROUGH – When the downstream concentration exceeds the allowable concentration.

BRIDGING – Where particles being removed from the air form an arch over the individual openings/pleats in an extended surface filter, blocking the narrow air passages between pleats and reducing the service life of the filter.

BROWNIAN MOTION – The random movement of microscopic particles suspended in a liquid or gas, caused by collisions with molecules of the surrounding medium. Also called Brownian Movement.

BTU (BRITISH THERMAL UNIT) – A standard measure of heat content in a substance that can be burned to provide energy.

BYPASS – Condition resulting from the fluid stream flowing through a housing without flowing through the filtering medium. In air filtration, unfiltered air going around the filter.

CAPACITY – Volume of air expressed in cubic feet per minute (CFM), or similar units that a filter is rated to handle.

CFM – Cubic feet per minute.

CHEMISORPTION – The combined process of adsorption, absorption, and oxidation, where gases trapped in chemisorbant media (adsorbent with an impregnant) are changed from gases into harmless solids.

CHIMNEY EFFECT – The tendency of heated air to rise due to lower density in comparison with ambient, also called thermal, updrafts. In cleanroom areas, heat generating equipment may cause severe upward air currents, resulting in unwanted turbulence.

CLEAN PRESSURE DROP – Differential pressure (drop) across a clean filter, typically measured in inches of water column (water gauge) or pascals.

CLEAN SPACE – A term referring to cleanrooms or work stations within a room.

CLEANING – Removal of soil from objects/surfaces.

CLEANROOM – A specially constructed enclosed area environmentally controlled with respect to airborne particulates, temperature, humidity, air pressure, airflow patterns, air motion, and lighting.

COALESCING – Action of uniting of small droplets of one liquid, preparatory to its being separated from another liquid.

COMPOSITE MEDIA – Media made up of more than one material.

CONTACT TIME – The length of time an absorbent is in contact with a liquid or gas prior to being removed by the filter.

CONTAMINANT – Synthetic or naturally occurring chemical, particle, or microorganism in air that could have adverse effects

NON-LAMINAR FLOW CLEANROOM – A cleanroom with no requirements for uniform airflow patterns and air velocities.

CORROSION – Conversion of metals into oxides, hydrated oxides, carbonates, or other compounds, due to the action of air or water, or both. Salts and Sulphur are also important sources of corrosion.

CRITICAL SURFACE – The surface in a cleanroom or work station to be protected from particulate contamination.

DEAD AREAS – Places in a medium where no filtering occurs. Also referred to as blind spots. The opposite of the effective area.

DECONTAMINATION – Removal of all pathogenic microorganisms from objects to ensure they are safe to handle.

DEGRADATION – The wearing down, or reduction in the efficiency of, the medium.

DELTA (Δ) P – A commonly used symbol denoting the difference in pressure between two points, such as the inlet and outlet of a filter. This difference is often referred to as the pressure drop and is typically measured in inches of water column (water gauge) or pascals.

DEPTH FILTRATION – Filtration accomplished by a progressively denser, deep medium, designed to allow finer particles to penetrate further into the medium, while larger particulates are lodged closer to the surface. A progressive density medium has superior dust holding capacity.

DIFFERENTIAL PRESSURE – Difference in pressure between two points, such as the inlet and outlet of a filter. This difference is often referred to as the pressure drop, and is typically measured in inches of water column (water gauge) or pascals.

Filtration Industry Definitions

DIFFERENTIAL PRESSURE INDICATOR – Indicator that signals the difference in pressure at two points.

DIFFERENTIAL PRESSURE SWITCH – Electrical switch operated by the difference between two pressures and often used to give warning of the end of a filtration cycle.

DIFFUSER – An air distribution outlet specifically designed to mix conditioned air with room air by induction. Mixing is accomplished by venture action, as the high velocity airstream leaving the diffuser aspirates ambient air toward the device.

DIFFUSION – A method of filtration that is effective on particles 0.1 micron and smaller, whose direction and velocity are influenced by molecular collisions (called Brownian Motion). Particulates of this size do not follow the airstream, but behave more like gases than particulate. Their dwell time in the media is longer as they are battered across the direction of flow in a random "helter skelter" fashion. When a particle strikes a fiber, it is retained by the inherent adhesive forces between the particle and fiber (van der Waals forces).

DISINFECTION – Elimination of many or all pathogenic organisms with the exception of bacterial spores.

DISPOSABLE – Describes an expendable component which is to be discarded after use and replaced with an identical component. This means that the component is replaceable, not reusable.

D.O.P. (DIOCTYL PHTHALATE) – An oil-like plasticizer which is readily atomized to form the test aerosol which was once used in the overall penetration and scan tests of HEPA filters. This test aerosol is now rarely used and has been replaced with PAO (poly-alpha-olefin).

DOWNSTREAM – Portion of the system located after a filter. Also, the leaving air or the clean air side of a filter.

DUAL LAYER MEDIA – Media in a filter element that has a coarse layer followed by a fine layer, to enhance dust holding capacity.

DUST HOLDING CAPACITY (DHC) – The total weight of ASHRAE test dust a filter can hold before reaching a given final resistance. This amount will vary, depending on the size and design of the filter and airflow rate. Typically reported in grams, DHC is used to provide a relative measure of filter service life.

EFFECTIVE AREA – Area of the medium exposed to flow and usable for its intended purpose (filtering). This term means the opposite of blind spots or dead area.

EFFICIENCY – Degree to which a filter will perform in removing solids, in accordance with the chosen test method.

EFFICIENCY CURVE – Graph showing the performance of a filter when challenged by specified contaminants under controlled conditions. Usually will be plotted against particle size at a given face velocity.

ELECTRET MEDIA – Filter media containing an electrostatic charge.

ELECTROSTATIC PRECIPITATION – A method of filtration that imparts a positive charge to airborne particulate matter and collects the particles on negatively charged collection plates.

EXFILTRATION – Outward air leakage from a space through openings, caused by pressure differences across these openings.

EXTENDED SURFACE FILTER – A category of filter that is designed with pleats or pockets to increase the amount of media exposed to the airstream within a given face dimension. Greater filter surface area reduces media velocity and increases efficiency and dust holding capacity.

FACE AREA – The area of a filter perpendicular to the flow direction.

FACE LOADING – The phenomenon by which contaminants in the air load up on the surface of the filter, causing an abnormal rise in resistance.

FDA – U.S. Food and Drug Administration, which is responsible for protecting and promoting public health through the regulation and supervision of food safety, tobacco products, dietary supplements, prescription and over-the-counter pharmaceutical drugs, vaccines, biopharmaceuticals, blood transfusions, medical devices, electro-magnetic radiation emitting devices, cosmetics, animal food and feed, and veterinary products. The FDA enforces Current Good Manufacturing Practices (CGMPs).

FIBER – Fundamental unit comprising a textile raw material such as cotton or wool.

FIBREGLASS – A term used to describe a variety of filter media made with glass fibers.

FILTER – A term generally applied to a device used to remove contaminates from the air. A filter may be one of a number of types, such as panel, automatic self-renewable, extended surface, HEPA, electrostatic, or gas phase. The term filter is sometimes erroneously used to describe the media used inside the device.

FILTER MEDIUM – The porous material mounted in the filter through which air is passed to remove the contaminants.

FILTRATION – The process of removing contaminants from liquid or gas by forcing them through a porous medium.

FINAL FILTER – The last and usually most efficient filter in a multi-stage filtration system.

FPM – Feet Per Minute. This term refers to the speed at which air moves through an area.

FRESH AIR – Term used for outdoor air.

GAS – The state of matter in which molecules move freely, causing matter to expand indefinitely, occupying the total volume available.

GAS-PHASE FILTER – Air cleaning device that uses the adsorption and/or chemisorption removal process. Typical filter mediums are activated carbon, alumina, and zeolite, with and without chemical impregnants.

GASKET – Material inserted between contact surfaces of a joint to ensure a seal.

HEPA FILTER – High Efficiency Particulate Air filter, which is capable of removing a minimum of 99.97% of 0.3 micron particles (typically PAO) of other gases from air.

HYDROCARBON – Any one of a large number of compounds composed primarily of the elements carbon and hydrogen. As they increase in molecular weight and boiling point, these compounds may be respectively gases, liquids, or solids.

HYDROPHILIC – Water accepting, or water wetting. Having an affinity for water, the opposite of hydrophobic.

Filtration Industry Definitions

HYDROPHOBIC – Non-water wetting. Having an antagonism for water, the opposite of hydrophilic.

IEST – Institute of Environmental Sciences and Technology, whose mission is "To globally expand and communicate the knowledge of contamination control, nanotechnology facilities, and test reliability. This is accomplished through the development of Recommended Practices and Standards by a community dedicated to professional collaboration, training, and education."

IMPINGEMENT – A method of filtration that is effective on particles with sufficient inertia to cause them to leave the airstream and collide with a fiber. Often referred to as "viscous impingement," when the fibers are coated with an adhesive.

INCHES W.G. – Abbreviation for "inches water column gauge." This is a method of reporting filter resistance (or pressure drop) across a filter.

INFILTRATION – Inward air leakage from a space through openings, caused by pressure differences across these openings.

INITIAL RESISTANCE – Differential pressure (drop) across a clean filter, typically measured in inches of water column (water gauge) or pascals. Synonymous with initial pressure drop, or clean pressure drop.

INTERCEPTION – A special case of the impingement method of filtration that does not depend on the inertia of the particles to bring them in contact with a fiber. Interception occurs when a particle follows the airstream but touches a fiber as it attempts to flow around it. The particle is held by the inherent adhesive forces between the particle and fiber (van der Waals force).

INTERSTICES – Spaces or openings in a medium, such as the spaces between intersecting fibers. Also referred to as pores or voids.

KNIFE-EDGE SEAL – A narrow, pointed ridge on the peripheral sealing surface of a filter or filter frame, which provides a seal by the impression of a sharp edge into a gasket or gel.

LAMINAR AIRFLOW – Airflow in parallel flow lines with uniform velocity and minimum eddies.

LAMINAR FLOW CLEANROOM – A cleanroom with a requirement for laminar airflow. Airflow velocities are usually not greater than 90 FPM.

LIFE EXPECTANCY – The service life or change-out interval of a filter cartridge. Even with known dust holding capacity, the useful life will vary according to the type and size of contaminants entering the filter, particularly on makeup air or 100% outside air systems.

LIFE CYCLE COSTS (FILTER) – Sum of all costs associated with operating a filter system, including product, energy, labor, transportation, and disposal costs.

MAKEUP AIR – Outside air introduced to the HVAC system for ventilation, pressurization, or to replace exhausted air quantities.

MASS TRANSFER ZONE – Area of the adsorbent bed where contaminants are removed from the airstream. The mass transfer zone will move away from the inlet of the bed to the discharge until breakthrough occurs (end of useful life of the medium).

MAXIMUM DIFFERENTIAL PRESSURE – The highest pressure differential which a filter is required to withstand without structural failure or collapse.

MAXIMUM RECOMMENDED PRESSURE DROP – Published final pressure drop by manufacturer.

MEDIA – Plural of medium. This is the material that performs the actual separation of contaminants from the air stream.

MEDIA VELOCITY – Speed of the air flowing perpendicular to the media, calculated by dividing the total airflow through a filter by the effective media area.

MEDIUM – The porous material through which air is passed to remove contaminants (particulates or gases). It is usually confined within a frame or cell sides and is generally referred to as a filter or filter cartridge.

MERV – Minimum Efficiency Reporting Value is a single number that is used, along with the air velocity at which the test was performed, to simplify the extensive data generated by the ASHRAE Standard 52.2, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. MERV is expressed on a 16 point scale (MERV 1 through MERV 16) and is derived from the particle size removal efficiency measured in the test.

MICRON OR MICROMETER – A unit of length in the metric system. This term means one millionth of a meter, 10-4 centimeter, 10-3 millimeter, or 0.000039 of one inch. It is commonly used as a measure of particle size or fiber size in filter media. The naked eye can see a particle approximately 10 microns or larger without magnification.

MICROORGANISMS – Living bodies that can be seen only through a microscope.

MIGRATION – Contaminant captured and subsequently released downstream of a filter.

MILLILITER – One thousandth of a liter, equal to one cubic centimeter.

MOORE'S LAW – The amount of information storable on a given amount of silicone doubles every year. (Gordon Moore, 1964, founded Intel)

NET EFFECTIVE MEDIA AREA – The amount of media area in a filter that is exposed to airflow and usable for collecting airborne contaminants. The opposite of blind spots or dead area, this term is synonymous with net effective filtering area.

NEGATIVE PRESSURE – Vacuum or suction.

NON-LAMINAR – As applied to cleanroom airflow, this is less desirable than laminar flow because the air supply is introduced at random, causing turbulence and induction that stir the airborne dust particles and keep them in suspension.

NONWOVEN – A filter cloth or paper that is formed of synthetic fibers that are randomly oriented in the media. It is usually held together with a binder or binder fibers.

NON-SUPPORTED FILTERS – Extended-area filters which rely on the airflow to support the media in the airstream. Filters will generally sag or collapse under low or no airflow conditions.

Filtration Industry Definitions

NVR – **Non Volatile Residue** - refers to the matter that remains after the solvent containing such matter has been filtered and evaporated at a specified temperature.

OFFGASSING – Term used to express the release of a gas from a material that was previously captured by an adsorbent. Preferential off-gassing occurs when an adsorbent releases a lighter molecular weight gas in order to adsorb a heavier molecular weight gas.

ORGANIC – Describes the vast number of chemical substances containing carbon, hydrogen, and oxygen.

OUTDOOR AIR – Ambient air that enters a building through a ventilation system, through intentional openings for natural ventilation, or by infiltration.

OXIDE – Combination of oxygen with another element.

OXIDATION – Any chemical reaction in which a material gives up electrons, as when the material combines with oxygen. Burning is an example of rapid oxidation, while rusting is an example of slow oxidation.

PANEL FILTER – A low efficiency filter, consisting of a flat sheet of media that is usually contained within a cardboard frame. An alternative design has an internal wire frame. Panel filters are typically made with fiberglass or synthetic media and are often referred to as throw-away filters.

PARTICLE COUNT – In a cleanroom, the particulate concentration expressed as particles per cubic foot or particles per cubic meter, by particle size, is used to express the Airborne Particulate Cleanliness Class in accordance with Federal Standard 209E or ISO Standard 14644-1. Depending on the cleanliness class, particles are simultaneously measured from 0.1 micron to 5 microns in size.

PARTICULATE MATTER (PM) – Also known as particle pollution, PM is a complex mixture of extremely small particles and liquid droplets. Particle pollution is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles.

PENETRATION – The leak rate through the filter, penetration is expressed as a percentage based upon a specific particle size. The percentage of penetration is the reciprocal of the percentage of the efficiency. HEPA filters, for example, have a 0.03% maximum penetration on 0.3 micron (µ) particles.

PLEATED FILTER – A type of extended surface filter where the media is folded back and forth to increase the amount of media exposed to the airstream within a given face dimension. Greater filter surface area reduces media velocity and increases the efficiency and dust holding capacity.

PLEATING – In filters with a paper medium or other sheet material, pleating means the folding processes which provide a large surface area within a given volume of filter.

PREFILTER – A filter placed in front of another filter to remove larger, heavier particles. The primary purpose of this is to extend the life of the final filters. Prefilters are highly recommended in systems requiring high efficiency filtration, especially where a high concentration of lint and larger particles are present.

PRESSURE DIFFERENTIAL – Difference in pressure between two points.

PRESSURE DROP – Difference in pressure between two points, generally at the inlet and outlet of a filter. Pressure drop is typically measured in inches of water column (water gauge) or pascals.

PRESSURE, STATIC – The fan-induced pressure that tends to burst or collapse a duct, which is required to move air through a system. Fans must push or pull air to deliver against resistance from duct friction, filters, coils, and other airflow obstructions.

PRESSURE, TOTAL – The combination of static pressure and velocity pressure within a duct.

PRESSURE, VELOCITY – The pressure required to maintain movement of air through a duct.

RESIDENCE TIME – The theoretical time that a contaminant is within the confines of a media bed.

RETENTIVITY – The ability of an adsorbent to resist the desorption of an adsorbate.

ROOM CLASSIFICATION

As Built - As built testing is carried out when the cleanroom envelope and all mechanical and electrical systems are complete but no production or process equipment is installed.

At Rest - At rest testing is carried out when all the production and process equipment is installed but has no occupancy of personnel.

Operational - Operational testing is carried out when all the production, process and occupants are in place– full working cleanroom.

SAMPLING

Isokinetic - Isokinetic sampling is when the sampling velocity is equal to the system or approach air velocity. Isokinetic sampling produces the most accurate and quantifiable results while leak scan testing.

Hyperkinetic - Hyperkinetic sampling is when the sampling velocity is greater than the system or approach air velocity. Leak scan testing via hyperkinetic sampling (greater than Isokinetic) produces less conservative readings that add the risk of missing leaks.

Hypokinetic - Hypokinetic sampling is when the sampling velocity is lower than the system or approach air velocity. It has been shown through experiment that the measured concentrations are conservative. In other words, leak scan testing via hypokinetic sampling (lower than Isokinetic) produces readings that may indicate a larger leak.

Note: Hypokinetic sampling method may be used qualitatively (not to quantify the reading at the leak) as a more conservative method than Isokinetic sampling to leak scan filters. In other words, this method increases the chances of finding a leak while leak scan testing.

SCAN TEST – Technique for disclosing leaks in HEPA and ULPA filters. Tests are performed by introducing a challenge aerosol upstream of the filters and passing the inlet of a sampling probe of an aerosol photometer or discrete particle in a series of parallel, slightly overlapping strokes across the downstream face of the filter (scanning), to detect any leaks.

Filtration Industry Definitions

SCFM – Standard Cubic Feet per Minute. This term refers to airflow that has been corrected to "standardized" conditions of temperature and pressure.

SENSOR360® – AAF IAQ sensor technology that measures PM and PD levels to optimize life and performance.

SKIN LOADING – The condition that occurs when collected particles build up on the surface of the media, plugging the spaces between the fibers. This is also known as blocking or surface loading. As a rule, the finer the media, the more susceptible it is to skin loading by "coarse" particles.

SORBENT – A substance that has the property of collecting molecules of another substance by adsorption or absorption.

STATIC TIP – Device used to measure static pressures in ducts or rooms. These devices are frequently installed upstream and downstream of a filter bank and connected to a pressure gauge to measure the pressure differential across the filter bank.

STERILIZATION – Complete elimination, destruction of all microbial life.

STOKES' LAW – A physical law which approximates the velocity of a particle falling under the action of gravity through a fluid. The particle accelerates until the frictional drag of the fluid just balances the gravitational acceleration, after which it will continue to fall at a constant velocity known as the terminal or free-settling velocity.

STRAINING – A method of filtration that removes larger particles. Straining occurs when a particle is larger than the space between fibers and cannot pass through them.

SULPA FILTER – Super Low Penetrating Air filter with a minimum efficiency of 99.9999% on 0.12 micron (μ) particles.

SURFACE AREA – The surface area of an adsorbent is determined by the BET method and is usually expressed in square meters per gram of adsorbent.

TCOD – **Total Cost of Ownership Diagnostics®** – AAF Software designed specifically to optimize LCC of HVAC filters.

TERMINAL HEPA MODULE – A HEPA filter module that is connected to the end of a duct, most often mounted in the ceiling of a cleanroom.

TERMINAL VELOCITY – Steady velocity achieved by a falling particle when gravitational forces are balanced by viscous forces. See Stokes' Law.

TEST AEROSOLS

DEHS: di-2-ethyl-hexyl-sebacate - Frequently used in the factory, occasionally in the field.

DOP: di-octyl-phthalate - Often prohibited, seen as being carcinogenic (Still utilized in Nuclear applications)

PAO: poly-alpha-olefin - Most commonly utilized test aerosol in the field for Life Science applications.

PSL: poly-styrene-latex - mono dispersed spheres, typically used as a challenge aerosol in the HEPA manufacturing facility.

U DESCRIPTOR – method to present the measurement results for ultrafine particle concentration in a cleanroom. The descriptor serves as the upper limit for the location averages or as an Upper Confidence Limit (UCL), or both as appropriate.

UL 586 – Standard for High Efficiency, Particulate Air (HEPA) Filter Units. For this standard, filters are tested for efficiency and penetration and undergo a moisture test, heated air test, a low temperature test, and a spot flame test. A UL 586 label can only be applied to HEPA filters whose designs have been proven to meet the requirements of UL 586 test standard and must be tested for efficiency and resistance.

UL 900 – Standard for Air Filter Units. Filters that are classified to this standard and bear the UL mark meet the requirements of the test for the amount of smoke generated and the combustibility of the air filter unit. Filters meeting the standard are classified as follows: "Air filter units covered by this standard are classified as those that, when clean, burn moderately when attacked by flame or emit moderate amounts of smoke, or both."

ULPA FILTER – Ultra Low Penetrating Air filter with a minimum efficiency of 99.9995% on 0.12 micron (μm) particles.

UNLOADING – Release downstream of trapped contaminate. This can be due to a change in flow rate, mechanical shock, vibration, excessive pressure build-up, or medium failure.

VAPOR – A substance diffused or suspended in the air, especially one that is normally liquid or solid.

VENTILATION – The movement of air to and from a space by mechanical or natural means, including both the exchange of air to the outside, as well as the circulation of air within a building or space.

VISIONAIR™ CLEAN WITH TCO DIAGNOSTIC® SOFTWARE – An AAF software designed specifically to optimize A/C change rates, HEPA and housing selection.

VOLATILE ORGANIC COMPOUNDS (VOCs) – Organic chemicals that have a high vapor pressure/low boiling point at ordinary room temperature, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air. The health effects of VOCs in indoor environments vary, depending on the type and concentration of VOCs, along with the length of time a person is exposed.

For enquiries email us at
enquiry@aafasia.com

Asia Sales Office

American Air Filter Manufacturing Sdn. Bhd.
(HQ - Malaysia) Tel : +60 3 5039 7777
(Penang - Malaysia) Tel : +60 4638 4100

AAF Australia Pty. Ltd.
(NSW HQ Sales Office) Tel : +61 2 9725 5443
(VIC Sales Office) Tel : +61 3 9701 5251

AAF International (Thailand) Co., Ltd. Tel : +66 2348 3870

AAF Singapore Pte. Ltd. Tel : +65 6897 0383

PT. AAF International Indonesia Tel : +62 21 8066 7232

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