


# Camfil Product Catalog

Camfil	Products & Solutions	
Air Filter Systems & Equipment		
Camfil - Clean Air Solutions		

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Commitment to quality...

...Camfil is the leader in clean air technology and air filter protection.

Camfil has its own product development, R&D and worldwide local representation.

Our overall quality goal is to develop, produce and market products and services of such a quality that we aim to exceed our customers expectations.

We see our activities and products as an expression of our quality.

To reach a level of total quality, it is necessary to establish an internal work environment where all Camfil employees can succeed together. This means an environment characterized by openness, confidence and good business understanding.

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### Worldwide Manufacturing Locations

China    France    Germany    Ireland    Malaysia    Slovakia    Sweden    Switzerland    United Kingdom

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**IAQ**

Concern over the quality of air inside of buildings is now receiving the attention that the quality of outside air received in the 1970's. Acceptable indoor air quality (IAQ) is defined in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 62.1: Ventilation for Acceptable Indoor Air Quality as: "Air in which there are no

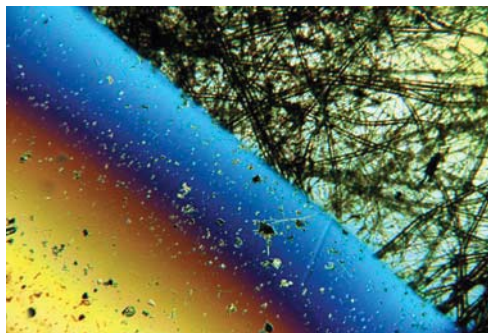
known contaminants at harmful concentrations and with which a substantial majority of the people exposed do not express dissatisfaction." It is clear, in many areas of the country, and in many buildings, we have a problem under this definition.

**Estimated potential productivity gains from Improved Indoor Environments (1996 US Dollars).**

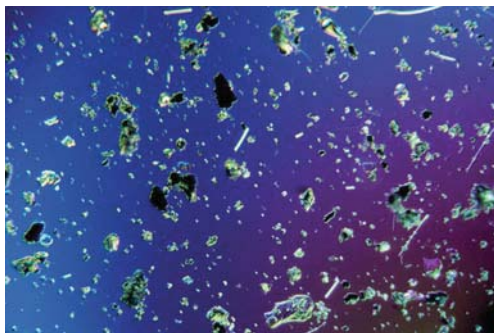
Source of productivity gain	Potential annual health benefits
Reduced respiratory illness	16–37 million avoided cases of common cold or influenza
Reduced allergies and asthma	10–30% decrease in symptoms in 53 million allergy sufferers and 16 million asthmatics
Reduced sick building syndrome (SBS) symptoms	20–50% reduction in SBS health symptoms experienced frequently at work by 2.15 million workers

*Fisk WJ. Estimates of potential nationwide productivity, and health benefits from better indoor environments: an update. In: Spengler JD, Samet JM, McCarthy JF, eds. Indoor Air Quality Handbook. New York: McGraw-Hill; 2001: 4.1–4.36.*

Poor IAQ has been shown to result in increased incidence of illness and absenteeism, reduced productivity, irritability, complaints about building odor and stuffiness, and health problems. These may include allergies, coughing, diarrhea, eye, nose, and throat irritation, fatigue, general respiratory problems, headaches, nausea, dizziness, runny nose, and skin irritation. Some contaminants enter a building from the outside, while others are generated internally. Often, these problems appear one to two hours after the occupants arrive at the building and disappear one or two hours after they leave the building. A slight cold can persist for weeks or even months. The culprit is often the continuous exposure to excessive levels of contaminants.



*Some common atmospheric contaminants relative to a human hair.*



*Atmospheric air has hundreds of thousands of particles per cubic foot. In many areas, it does not make sense to introduce contaminant laden air into a building. It makes sense to re-circulate clean, filtered air.*

Studies have shown that we should be concerned about respirable size particles, those that can penetrate deep into the lungs and do damage. ASHRAE addresses this in their Standard 62.1, and the United States Environmental Protection Agency (EPA) provides actual air quality data on a daily basis in many locations throughout the United States because of immediate health concerns when levels are elevated. These lung-damaging particles are 0.2 to 5.0 micrometers in size. Larger particles are filtered by the body's natural protection system in the nose, the throat and trachea before they can penetrate deeper into the lungs.

Smaller particles, less than 1-micron in size, because of their physical properties can penetrate deep into the lungs and reach bronchioles, bronchi, and the critical alveoli. Most maladies, including infections, occur in the lungs. Ninety-nine percent of all airborne particles are under 1-micron in size with the typical air sample having hundreds of thousands of these potentially damaging particles in each cubic foot of air. This critical sub-micron particle range should be the focus of our particulate contamination concerns.

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**Airborne Contaminants and Indoor Air Quality**

A recent study in the Journal of the American Medical Association (JAMA) Vol. 287, No. 9: 1132-1141, provides the most definitive research to date, linking tiny soot particles with lung cancer. Researchers looked at the impact of soot particles smaller than 2.5 microns in cities throughout the United States. Particles this small are easily drawn into the alveoli, the smallest air sacs of the lungs. Because the lung is slow to clear foreign bodies from that deep within its system, the soot

deposits stay there and cause damage over long periods of time. Sources include diesel bus and truck emissions as well as ordinary auto exhausts, industrial and utility smokestacks, mining, and construction. The researchers analyzed data from 500,000 adults who were surveyed as part of an ongoing cancer study from 1982 to 1998. They have calculated that the number of deaths from lung cancer increases by 8 percent for every 10 micrograms of fine particle matter per cubic meter.

**The following chart notes some common airborne pathogens, their relative size and a removal efficiency based upon the MERV of a filter.**

Organism	Average Size (microns)/shape	MERV 6	MERV 8	MERV 10	MERV 13	MERV 15	MERV 16
Bacillus anthracis	1.1/spherical spores	15.5	36.7	39.2	96.3	99.9+	99.9+
TB bacilli	064 x 1 <sup>-5</sup> /rod	7.4	18.1	19.5	78.6	98	98.1
Smallpox virus	0.22/complex capsid	3.7	7.4	7.9	39.6	68	70.7
Influenza A virus	0.098/helical	6.2	11.2	12	46.2	71	79

*Kowalski, WJ, Bahnfleth WP. Immune-building technology and bioterrorism defense. HPAC Engineering, Jan 2003.*

People spend more than 90 percent of their time indoors - at home or work, in shopping centers, or vehicles. This leads to exposure to harmful air contaminants, thus having a tremendous impact on our health, and productivity.

During the last 20 years, researchers have explored the relationship between IAQ, health and productivity. Please review the following examples:

1. In a survey of 100 U.S. office buildings, 23 percent of office workers experienced frequent symptoms of Sick Building Syndrome (SBS) such as respiratory ailments, allergies, and asthma. The impact has usually been hidden in sick days, lower productivity, and medical costs. The economic impact is enormous, with an estimated decrease in productivity around 2 percent nationwide, resulting in an annual cost to the United States of approximately \$60 billion.
2. William Fisk, from Lawrence Berkeley National Laboratory in California, was one of the early researchers to examine IAQ effects on health and productivity. In a recent article, he established a baseline for quantifying benefits from improved IAQ and demonstrated the economic impacts of increased productivity. Findings are showing that improvement in IAQ can:
  - Reduce SBS symptoms by 20 to 50 percent, with estimated savings of \$10 to \$100 billion
  - Reduce asthma by 8 to 25 percent, with estimated savings of \$1 to \$4 billion
  - Reduce other respiratory illnesses by 23 to 76 percent, with estimated savings of \$6 to \$14 billion
  - Improve office worker productivity by 0.5 to 5 percent, with estimated savings of \$20 to \$200 billion
3. A recent study by Bjarne Olsen, chairperson for the International Center for Indoor Environment and Energy (ICIEE) in Denmark, indicated that improved thermal comfort, reduction in indoor pollutants, enhanced ventilation rates, and ventilation effectiveness can increase productivity by 5 to 10 percent. Conversely, the research also indicates that a 10 percent decrease in tenant satisfaction with IAQ results in a 1 percent drop in productivity.
4. Pawel Wargocki, also from the ICIEE, conducted three separate studies showing an increase of productivity at 5 percent or more through IAQ improvements.

Clearly, productivity gains cannot be projected the way that energy savings can be, but research strongly suggests that the investment in a high-performance IAQ building pays off in occupant productivity.

**What Causes Poor IAQ?**

Poor IAQ is caused by airborne particulates and gases or vapors that adversely affect occupant health and comfort, the building structure, or its furnishings. Some IAQ problems, called "sick building syndrome," are new and are the result of changes in HVAC system design and operating practices; others have existed for years, but building occupants are only now complaining about them. Air quality problems in buildings are usually related to the following pollutants:

- Particulates including airborne dirt, dust, lead, or asbestos
- Volatile organic compounds (VOCs), including chemicals, such as formaldehyde or other gases from building materials, carpets, furniture, or ozone from copiers and other office equipment
- Biological contaminants including bacteria, mold, and mildew that come from contaminated air handling systems, books, carpets, etc., usually related to unacceptably high levels of moisture or humidity
- Bioeffluents, or other contaminants, both gaseous and particulate, generated by the building occupants

Microorganisms are a leading source of contamination. These include bacteria, fungi, yeast, and algae. They are found everywhere and can cause human and building maintenance problems. Microorganisms are present on all environmental surfaces (including humans), in the air, and in water associated with normal building operation. Like humans, microorganisms need two things to live -- moisture and nutrients. Given acceptable growth conditions, microorganisms can multiply from one or two organisms to more than 1 billion organisms in just 18 hours. In most cases, problems relating to microorganisms can be addressed by proper control of moisture and humidity. Removing one or the other will usually eliminate these nuisances. A properly maintained and correctly

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## Airborne Contaminants and Indoor Air Quality

operating HVAC system will maintain space humidity between 40% and 55%. The majority of microorganisms require higher levels to exist and propagate.

Building maintenance problems caused by microorganisms include odor, staining, and deterioration of interior surfaces, such as ceilings, walls, carpets, draperies, and other surfaces. Microorganisms also contribute to corrosion, which is responsible for billions of dollars worth of damage to our buildings each year. We can all relate to the discomfort from mildew odors and the costs involved in removing the damage to surfaces affected by their growth.

Poor indoor air quality is often the result of inadequate ventilation strategies that are directly traceable to rising energy costs. Building managers have changed the manner in which they operate their HVAC systems, and the systems themselves are constantly being modified for greater energy efficiency. Some of these changes have led to a reduction in the level of ventilation:

- Buildings are operated with a higher percentage of recirculated air and an inadequate fresh air supply, sometimes as little as 1.0%.
- Buildings are tightly sealed to reduce infiltration. In years past, building leakage often made up for HVAC system ventilation deficiencies.
- Variable air volume systems may operate as low as 25% of the design airflow.
- Other operating and maintenance practices can also add to serious indoor air quality problems.

With today's economic operating restrictions, a building's maintenance budget is often one of the first casualties when cuts are required. The following maintenance practices can lead to poor indoor air quality:

- Completely shutting down the HVAC system at night and on weekends. Under humid conditions, condensation can build up inside ductwork. If dirt is present in damp ducts, spores, mold, and bacteria can flourish to be spread throughout the building when the system is started. Unfortunately, the dust accumulation and growths of mold, bacteria, etc. are hidden inside the ductwork. Fan systems that start and stop throughout the day may cause more dirt and contamination to be dislodged and carried into occupied areas.
- Increasing the levels of improperly filtered, recirculated air, that continually redistribute the gaseous and particulate contaminants within the building, allowing them to grow to unacceptable levels. There is a cumulative effect on occupant discomfort throughout the day and the week because of increased levels of contamination.
- Reducing housekeeping procedures results in more dust and dirt in the building.
- Switching to lower cost, lower efficiency filters to reduce pressure drop and save on replacement filter costs means that more particulate contaminants are carried throughout the building and allowed to build to unacceptable levels.
- Lowering ventilation rates may result in lower building humidity levels in some geographic areas during certain seasons, and this may affect eye, nose, throat, and skin conditions of occupants.

- Maintaining buildings at higher temperatures in the summer and cooler temperatures in the winter.
- Increasing use of synthetic construction materials and furnishings that can be the source of gaseous contamination (commonly referred to as off-gassing).

Additionally, any area of excessive moisture must be addressed. Sources of water in an HVAC system must be eliminated or controlled. Condensate drain pans should be cleaned periodically. Drains should be free of obstruction, and the entire HVAC moisture removal system should be checked periodically to assure the elimination of freestanding water.

Some areas require additional consideration. Laboratories, industrial technology shops, locker rooms, copier or printer rooms, photography darkrooms, and toilet areas should be under negative pressure to prevent contaminants from spreading to other areas of the building. A slight inward air velocity of 100 feet per minute is all that is required and may often be addressed with a small venting fan. Additionally, copier rooms should have filtration capable of 65% efficiency at removing particles 0.3 micron in size.

If you have problems in your facility be proactive:

- Address the issue immediately and apply corrective action. Do not discount your building occupant's ability to understand the problem. There is a wealth of information available, including the Internet, specifically addressing this problem.
  - Assign an individual to monitor problems and form an action committee to work with your health, facilities, and administrative personnel. Maintain a data tracking system to avoid repeats of problem situations and document corrective actions.
  - Involve people in your facility by educating them about IAQ red flags for buildings and their occupants. Teach HVAC basics, such as proper operation of unit fans and the importance of not blocking registers (returns and supplies).
  - Enlist the aid of competent outside experts. Many product vendors can address proper IAQ and will often supply speakers for local meetings.
- The cost of providing proper indoor air quality can be more than offset by:
- Reduced absenteeism.
  - Reduced building deterioration and maintenance.
  - Prevention of complaints based upon environmental problems that can often result in strained relationships.
  - Reduction of liabilities.
  - Increased productivity.



## Selecting the Proper Filter

Controlling indoor air quality with particulate filters is relatively easy and effective. Filters are available with a wide range of air cleaning capability, from "roughing" filters for catching dust, lint, and hair, to HEPA filters for ultra high sub-micron particle capture efficiency. There is a wealth of information available from organizations such as the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE), your local filter sales representative, and reputable manufacturers of quality air filtration products.

ASHRAE publishes information in their handbooks and in some of their standards as to what filter should be the minimum standard of care for a prescribed application. For commercial buildings, they recommend a minimum of MERV 8 to MERV 11. For medical facilities, they recommend MERV 14 for most critical areas. For your convenience, we have published a synopsis of those minimum requirements on the next page. Local codes or recommended practices, as published by specific industries, may require additional filtration considerations.

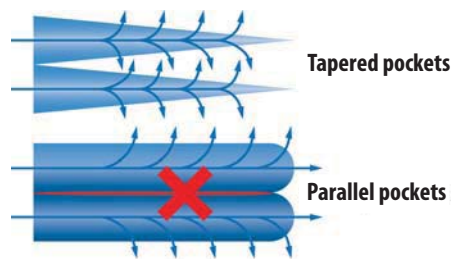
If your occupied building is seeking certification within the parameters of Leadership in Energy and Environmental Design (LEED), the minimum efficiency for certification is MERV 13. LEED is a third party certification program and the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. Camfil is a member of the United States Green Building Council.



In today's world of ever-increasing energy costs, filter configuration and media area must be a part of the filter selection process. An air filter may use up to 60% of the energy used to move air through a HVAC system. When we consider that 35% of the energy used in North America is used to move air, the energy savings and the resultant effect on our environment can be substantial if we select a filter that uses less energy and lasts longer.

Two factors dictate how much energy a filter will use; the amount of total media area exposed to airflow and the configuration of the overall media package. A low capacity pleated panel filter, with one-third less media area, may use up to twice as much energy as a high capacity pleated panel filter. The low capacity pleat will need to be changed more often, requiring increased manpower and adding additional filters to our waste processes. Likewise, a high efficiency filter with more media area will use less energy, have reduced disposal implications, and generally be friendlier to the environment.

A filter that is designed to have low configuration loss will also use less energy and last longer. There are tradeoffs related to total media area, overall space limitations for the media pack and media spacing, and support. As an example, Camfil Hi-Flo filters incorporate a tapered pocket to reduce pocket-to-pocket contact and ensure that air has more paths to move through the filter. Resistance to airflow is reduced; the filter lasts longer because filter media blinding is eliminated and the full media area is utilized.



### × Blocked surface = high energy consumption

Another often-overlooked selection parameter that can further reduce energy and extend the life of a filter is de-rating the velocity through the filter. Manufacturers publish airflow data at specific base points as a guideline. The base point for ASHRAE grade filters is 500 fpm or 2000 cfm for a 24" by 24" filter. For HEPA filters, it is 250 fpm or 1000 cfm per 24" by 24" filter.

If the velocity through a filter is reduced by 40%, the decrease in resistance can be 60%, and the life of the filter may be extended up to three periods. More applicable to new construction projects, when filter framing and housings are selected, the payback to the user over the life of the system is significant. For a 20-ton HVAC system, the change equated to using six full size (24" x 24") filters instead of four filters. The additional cost of framing or housing size can be recovered in less than one year.

The following pages list filter efficiencies for specific applications as prescribed by cognizant authorities. They are the baselines, and we should always consider increasing filter efficiency while balancing system pressure drop and the ultimate energy expenditure. The following section provides some specifics for selecting particulate and gaseous filters. For questions specific to your application, please contact Camfil or your authorized distributor or representative.



## Airborne Contaminants and Indoor Air Quality

Recommended minimum efficiencies by area as published by the American Society of Heating, Refrigerating, & Air-Conditioning Engineers (2007 Applications Handbook).

Application	Minimum Filtration Efficiency
Airport Terminals	MERV 8 or better plus charcoal
Museums, Galleries, Libraries, and Archives	MERV 8 prefilter, plus charcoal and MERV 13 or MERV 14
Arenas & Stadiums	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Atriums	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Auditoriums	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Bars	MERV 8 or better plus charcoal with manual air purge
Bowling Centers	MERV 4
Bus Terminals	MERV 8 plus exfiltration
Cafeterias and Luncheonettes	MERV 8 or better
Communication Centers, Telephone Terminal Rooms	MERV 13 or better
Convention & Exhibit Centers	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Data Processing & Electronic Office Areas	MERV 11, minimum MERV 8
Garages	MERV 4
Hotel/Motel Assembly Rooms	MERV 8 or better
Hotel/Motel Conference/Meeting Rooms	MERV 8 or better
Hotel/Motel Guest Room	MERV 6 to MERV 8
Hotel/Motel Lobbies	MERV 8 or better
Houses of Worship	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Kitchens	MERV 4
Laboratories (Biological & Biomedical)	MERV 13 or MERV 14, plus possible HEPA
Laboratories (Chemistry & Physics)	MERV 13 or better
Natatoriums (pool areas)	MERV 8 minimum, up to MERV 13 for facilities with expensive interior decor
Nightclubs and Casinos	MERV 8 or better plus charcoal with manual air purge
Office Buildings	MERV 8 to MERV 11 or better
Radio and Television Studios	MERV 8 or better
Restaurants	MERV 8 or better
School Administrative & Office Space	MERV 6 to MERV 8
School Classroom	MERV 6 to MERV 8
School Storage	MERV 1 to MERV 4
Shipping Docks	MERV 4
Warehouses	MERV 4 to MERV 8

Medical Facility Area Designation	Minimum # of Filter Beds	Bed # 1	Bed # 2
Orthopedic operating room, bone marrow transplant operating room, organ transplant operating room	2	8	HEPA filters at air outlets <sup>1</sup>
General procedure operating rooms, delivery rooms, nurseries, intensive care units, patient care rooms, treatment rooms, diagnostic and related rooms	2	8	14
Laboratories and sterile storage	1	13	
Food preparation areas, laundries, administrative areas, bulk storage and soiled handling areas	1	8	

<sup>1</sup> Camfil recommends an intermediary stage to increase the life of the HEPA filter (MERV 13 or 14)



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### Selecting filters for Particulate Removal

The basics of selecting particulate filtration include:

1. Identify the contaminant(s) to be removed.
2. Determine or check the particle size and concentration of that contaminant using available government agency data or your own air sampler.
3. Decide what level of filtration removal efficiency is acceptable for the particle size or application encountered.
4. Consider at least MERV 8 to 11 for non-critical applications. Public spaces with a high degree of occupant movement, high rate of product turnover, or frequently scheduled housekeeping, such as in industrial areas, shopping centers, or public offices fall in this category.
5. Consider at least MERV 13 for "average" applications, such as private and public office buildings, schools, universities, and theaters.
6. Consider at least MERV 13 to 14 for more prestigious buildings or critical applications like music halls, museums, libraries, general hospital spaces and telephone exchange buildings.
7. Consider at least 95% at 0.3 micron or 99.999% at most penetrating particle size for very critical areas and where, effectively, no particulate penetration is acceptable, such as specialized areas of hospitals, pharmaceutical and electrical product manufacturing, bacteriological and nuclear applications.
8. Note that filters below MERV 6 efficiency, such as fiberglass or polyester disposables, should be used only as prefilters to remove large particles and extend the service life of the higher efficiency final filters. Used alone, they only add resistance to the system, require cleaning or replacement, and are ineffective in removing staining particles (particles that leave dirt streaks on ceilings, windows, and walls, as well as coating mechanical equipment, coils, and the inside of ductwork).

Other considerations:

1. Filter installation space requirements.
2. Depth available in direction of airflow.
3. Accessibility for filter replacement.
4. Desirability of side loading filter housings or modular framing systems.
5. The cost of the initial filtration system, including filters, holding frames, supports and any required wiring or duct transitions. These costs can increase significantly in terms of power requirements and maintenance of filter housing devices like automatic roll filters and electronic agglomerators.
6. The quality of the product should be high, including the material(s) used, workmanship, integrity of construction, reliability, and market reputation.
7. The performance, design characteristics, and advantages, such as initial pressure drop, media area, energy consumption, and filter life, should always be considered. Test reports should be requested on all efficiency filters (MERV 6 to MERV 15) as a means of comparing "equivalent" filters rather than relying on manufacturer's promotional literature.

### Selecting Molecular Filters

Removing gaseous contaminants is more complicated than removing particles. Different gases have different characteristics and may require different adsorbers. Unfortunately, there is no single type of adsorber that is effective on all of the gases known to affect indoor air quality. Activated carbon is the most popular adsorbent choice because it is an excellent medium for removing odors, and it has an affinity for a wide range of contaminants. Activated carbon is naturally occurring carbon made from coconut shell, or other organic material, that has been cleaned or stripped of all foreign substances by steam treatment and distillation.

For descriptive purposes, think of activated carbon as the "skeleton" of what remains after burning any organic material. This skeleton contains thousands upon thousands of minute cell-like chambers, each with a different amount of internal surface area. One pound of activated carbon has approximately 5 million square feet of surface area capable of adsorbing up to 1/2 pound of odor.

When applying carbon to a specific, or general, air-cleaning problem, we must realize some simple properties of gases in general:

**Heavy Gases** - those with high vapor pressures, with boiling points above 0° F, tend to be complex molecules with low molecular activity.

**Light Gases** - those with low vapor pressures, boiling points less than 0° F, tend to be simple molecules with high molecular activity. Examples include ozone, carbon monoxide, and hydrogen.

Activated carbon works by actually capturing a gas within one of the cells of its structure. Heavy gases, because of their low molecular activity, tend to be easily "captured" and retained until sufficient quantities of similar gases fill the cells, causing breakthrough and downstream migration and subsequent detection of the gas. At this time, replacement or re-activation of the carbon must occur. Lighter gases, on the other hand, having high molecular activity, tend to pass through the carbon bed without retention or capture. In many cases, a reactive type adsorbent must be utilized to actually change the gas by chemical reaction into a different substance.

Factors that affect adsorption efficiency include:

**Heat** - The higher the temperature, the higher the molecular activity of the gas, the more difficult it is to adsorb. In addition, should temperature increase during the life of the carbon, increased molecular activity will decrease the time before breakthrough.

**Humidity** - Water vapor (boiling point 212° F) is extremely attracted to carbon. It may take up residence in many of the "cells" reserved by the designer for more harmful contaminants. Of course, water vapor will be readily given up with the introduction of dry gas.

## Airborne Contaminants and Indoor Air Quality

To be effective, an activated carbon filter must be selected properly. There are several basic ways to properly size an adsorbent filter system:

1. Rule of thumb
2. Test adsorber
3. Location/volume
4. Odor inventory: This is the most accurate means of sizing an adsorbent filter system. You simply select the filter on the basis of rated capacity and put the filters in the air circulating system on a purely match cfm basis.

**Rule of thumb:** In most cases, this approach results in adequate molecular contaminant filtration. A system sized this way usually requires carbon renewal every two or three years.

**Test Adsorber:** This is an excellent, yet simple method of proving if an adsorbent filter will, or will not, eliminate an unusual or tough odor problem. The test adsorber should have an air capacity of 50 to 65 CFM and contain 2 to 2½ pounds of activated carbon. This is the same airflow-to-weight ratio as used in Camfil adsorbent filters. The test is made by simply turning on the test adsorber, and smelling the exhaust to see if it is adsorbing the odor. The filter may then run for an extended period (several weeks or months) and be field-tested to determine remaining life.

**Location/Volume:** This method is based on the assumption that a given weight of activated carbon will eliminate the odor in a specified volume, at a specific location. While this is a generalized method, experience has proven it to be successful. To use this method, an inventory of location, in terms of contaminants, is made. The volume of each location is then converted into pounds of activated carbon per thousand cubic feet of volume, and the total activated carbon combined.

The Camfil adsorbent filter selection made by this method must always be checked to make sure the CFM and pressure drop conditions are met. Low flows through Camfil adsorbent filters will not affect their efficiency on odor removal. Consult factory for application or location/volume data.

**Odor Inventory:** This is the most accurate approach to sizing an adsorbent filter installation. In order to use this method, the odor must be identified chemically, and the concentration in pounds per volume per time must be determined. After the odor inventory is completed, and the weight of activated carbon determined, the selection of the adsorbent filter is made. The selection must then be checked for cfm and pressure drop requirements.

Low flows in adsorbent filters will not affect their efficiency on odor removal. To enhance this gaseous adhesion within the carbon cells, increase the surface area with which the gas is in contact, thereby decreasing the air velocity over the area, increase the time the gas is in contact with a surface, or decrease the air velocity over the surface.



**Airborne Contaminants and Indoor Air Quality**

**Key:**

- 4. A very high level of adsorption, in the order of 20 - 40% by weight of dry carbon.
- 3. Good index with a capacity of 10 - 20%.
- 2. Mediocre index that may require a particularly long contact time, requires case by case study.
- 1. Practically no adsorption, another solution must be sought.

**Adsorption index of Activated Carbon for various types of odors.**

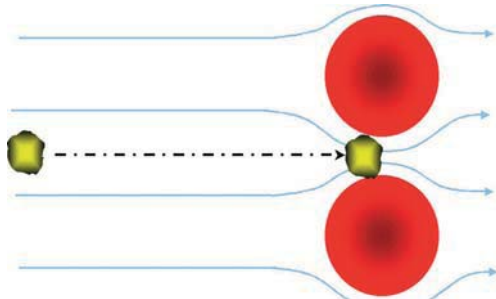
2 Acetaldehyde	1 Carbon monoxide	3 Ethyl bromide	4 Lubricants	3 Pentylene
4 Acetic acid	4 Carbon tetrachloride	1 Ethylene	4 Medicinal odors	3 Pentyne
4 Acetic anhydride	3 Chlorine	4 Ethylene dichloride	4 Menthol	4 Perchloroethylene
3 Acetone	4 Chlorobenzene	2 Ethylene oxide	4 Mercaptan 2-4	4 Perfumes, cosmetics
1 Acetylene	4 Chloroform	2 Ethyl mercaptan	1 Methane	4 Perspiration
3 Acids 2-4	4 Chloronitropropane	4 Ethyl silicate	3 Methyl acetate	4 Petrol
3 Acrolein	4 Chloropicrin	4 Eucalyptol	4 Methyl acrylate	4 Phenol
4 Acrylic acid	4 Chloroprene	4 Faecal odors	2 Methyl alcohol	3 Phosgene
4 Acrylonitrile	3 Cigarette smells	3 Farmyard smells	3 Methyl bromide	4 Plastics
4 Adhesives	4 Cleaning solvents	4 Fertilizer	4 Methyl butyl ketone	2 Propane
4 Alcohol 2-4	3 Cooking smells	3 Film developing	3 Methyl chloride	4 Propanol
4 Amines 2-4	4 Creosote	2 Fish odors	4 Methylcyclohexane	2 Propylene
2 Ammonia	4 Cresol	4 Floral odors	4 Methylcyclohexanol	4 Propyl mercaptan
2 Amyl acetate	4 Cyclohexane	2 Formaldehyde	4 Méthylcyclohexanone	4 Resins
4 Amyl alcohol	4 Cyclohexanol	3 Formic acid	4 Methylene chloride	4 Rubber
4 Amyl ether	4 Cyclohexanone	3 Freon	3 Methyl ether	2 Slaughterhouse
3 Anesthetics	4 Cyclohexene	4 Gangrene smell	4 Methyl ethyl ketone	3 Soap
4 Aniline	4 Deodorants	4 Garlic	4 Methyl isobutyl ketone	3 Solvents
4 Animal carcasses	4 Detergents	4 Heptane	4 Methyl mercaptan	4 Styrene monomer
3 Animal odors	4 Dibromoethane	4 Heptylene	4 Monochlorobenzene	2 Sulphur components
4 Antiseptics	4 Dichlorobenzene	3 Hexane	4 Naphtha (coal tar)	2 Sulphur dioxide
4 Asphalt fumes	4 Dichloroethane	3 Hexylene	4 Naphtha (oil)	4 Sulphuric acid
3 Bathroom smells	4 Dichloroethylene	3 Hospital odors	4 Naphthalene	3 Sulphur trioxide
4 Benzene	4 Diesel fumes	4 Household smells	4 Nicotine	4 Tar
3 Bleaching solutions	3 Diethylamine	1 Hydrogen	3 Nitric acid	4 Tetrachloroethane
2 Body odors	3 Diethyl ketone	2 Hydrogen bromide	4 Nitrobenzene	4 Tetrachloroethylene
4 Bromine	4 Dimethylaniline	2 Hydrogen chloride	4 Nitroethane	3 Tetrahydrofuran
4 Burnt flesh	4 Dimethylsulfate	2 Hydrogen cyanide	2 Nitrogen dioxide	4 Tobacco odors
3 Butadiene	4 Dioxane	2 Hydrogen fluoride	4 Nitroglycerine	4 Toilet smells
2 Butane	4 Dipropyl ketone	3 Hydrogen iodide	4 Nitromethane	4 Toluene
4 Butanone	4 Disinfectants	2 Hydrogen sulfide	4 Nitropropane	4 Trichlorethylene
4 Butyl acetate	4 Embalming products	4 Incense	4 Nitrotoluene	4 Urea
4 Butyl alcohol	4 Essential oils	3 Industrial waste	4 Nonane	4 Uric acid
4 Butyl chloride	1 Ethane	4 Iodine	4 Octane	4 Vehicle exhaust
2 Butylene	3 Ether	4 Iodoform	4 Onions	4 Vinegar
4 Butyric acid	4 Ethyl acetate	3 Isoprene	4 Ozone	2 Vinyl chloride
4 Camphor	4 Ethyl acrylate	4 Isopropyl acetate	4 Paint odors	2 Wood alcohol
4 Caprylic acid	2 Ethyl alcohol	3 Isopropyl alcohol	4 Paradichlorobenzene	4 Xylene
3 Carbon disulphide	3 Ethylamine	4 Kerosene	3 Pentane	
1 Carbon dioxide	4 Ethyl benzene	4 Lactic acid	4 Pentanone	

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## Principles of Air Filtration

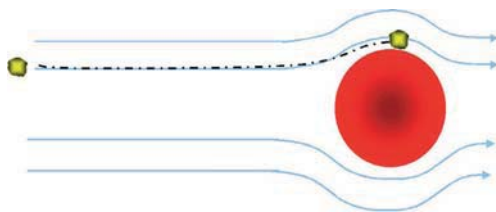
Five different collection mechanisms govern particulate air filter performance: straining, interception, diffusion, inertial separation, and electrostatic attraction. The first of these mechanisms applies mainly to mechanical filters and is influenced by particle size. The last involves an imparted charge to enhance performance.

### Straining Effect



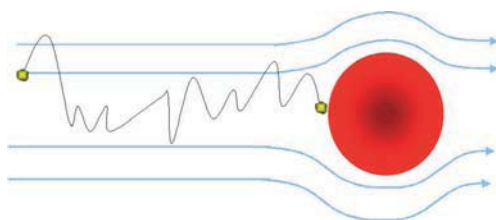
Straining occurs when the opening between the media members (fibers, screen mesh, corrugated metal, etc.) is smaller than the particle diameter of the particle the filter is designed to capture. This principle spans multiple forms, or filter designs, and is entirely related to the size of the particle, media spacing, and media density.

### Interception Effect



Interception occurs when a large particle, because of its size, collides with a fiber in the filter that the air stream is passing through.

### Diffusion Effect

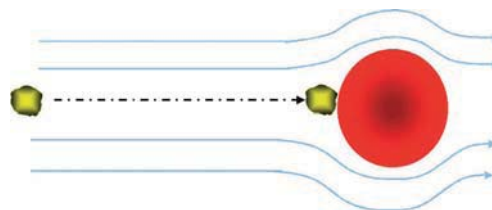


Diffusion occurs when the random (Brownian) motion of a particle causes that particle to contact a fiber. As a particle

vacates an area within the media, by attraction and capture, it creates an area of lower concentration within the media to which another particle diffuses, only to be captured itself. To enhance the possibility of this attraction, filters employing this principle operate at low media velocities and/or high concentrations of microfibrils, glass or otherwise.

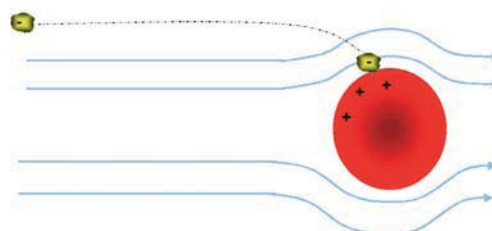
The more time a particle has in the "capture zone", the greater the surface area of the collection media (fibers), the greater the chances of capture. Filter manufacturers have two distinct methods of addressing this principle — employ more square footage of fine glass-mat type media or employ less square footage of high lofted glass media.

### Inertia Effect



Inertial separation uses a rapid change in air direction and the principles of inertia to separate mass (particulate) from the air stream. Particles at a certain velocity tend to remain at that velocity and travel in a continuous direction. This principle is normally applied when there is a high concentration of coarse particulate, and in many cases as prefiltration mode to higher efficiency final filters.

### Electrostatic Effect



Electrostatic attraction plays a minor role in mechanical filtration. After fiber contact is made, smaller particles are retained on the fibers by a weak electrostatic force. The force may be created through a manufacturing process, or be dependent upon airflow across media fibers. The force is eradicated as media fibers collect contaminant that acts as an insulator to a charge.

Impaction and interception are the dominant collection mechanisms for particles greater than 0.2  $\mu\text{m}$ , and diffusion is dominant for particles less than 0.2  $\mu\text{m}$ .

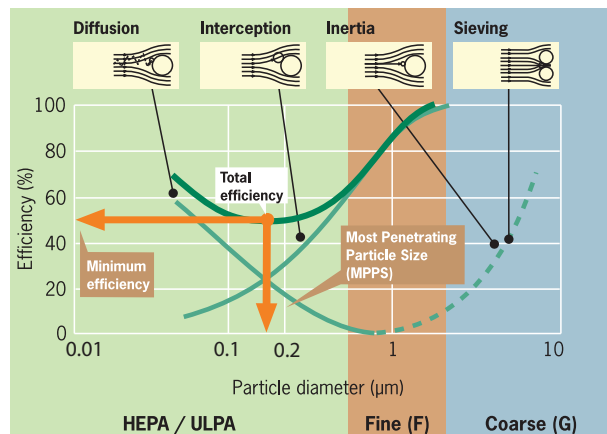
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Principles of Air Filtration

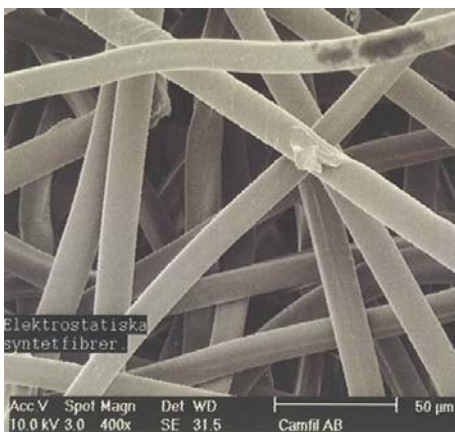
The following chart notes the four mechanical particle capture effect principles and their value to relative particle sizes.



As mechanical filters load with particles over time, their collection efficiency and pressure drop typically increase. Eventually, the increased pressure drop significantly inhibits airflow, and the filters must be replaced. For this reason, pressure drop across mechanical filters is often monitored because it indicates when to replace filters.

Conversely, electrostatic filters, which are composed of polarized fibers, may lose their collection efficiency over time or when exposed to certain chemicals, aerosols, or high, relative humidity. Pressure drop in an electrostatic filter generally increases at a slower rate than it does in a mechanical filter of similar efficiency.

Thus, unlike the mechanical filter, pressure drop for the electrostatic filter is a poor indicator of the need to change filters. When selecting an HVAC filter, you should keep these differences between mechanical and electrostatic filters in mind because they will have an impact on your filter's performance (collection efficiency over time), as well as on maintenance requirements (change-out schedules).



The above photo shows coarse fiber/electret media magnified 400 times. Coarse/electret fibers, because of their large size, are easier and less expensive to produce. Their primary effect of particle capture requires a charge imparted on the fiber during the manufacturing process. As the charge dissipates because of particulate loading, so does the efficiency of the filter. This is a critical condition, as 98% of all particles are under 1 micron in size — the range where these types of filters suffer critical loss of efficiency.



The above photo shows fine fiber media magnified 400 times. Fine fiber media operates under a mechanical removal principle, and fibers do not lose efficiency over time. Their initial efficiency is indistinguishable from their actual efficiency over life, providing the user with the particle removal performance they have specified.

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## ASHRAE Standard 52.2

In ASHRAE Standard 52.2, an air filter's performance is determined by measuring the particle counts on both the upstream and the downstream of the air filter device being tested. The filter user is then provided capture efficiency values throughout a range of particle sizes, allowing them to be specific in selecting a filter that has the best efficiency for the contaminant they want to remove.

If a user wants to remove paper dust in a bill processing facility, they can select a filter with a high efficiency specific to the relatively large size of that contaminant. If the contaminant of concern is tobacco or welding smoke, they can select a filter specific to the much smaller size of that contaminant. Each manufacturer should be able to provide a graph for each product that shows that product's capture efficiency through the twelve individual particle size ranges of the test.

To simplify filter selection, the Standard defines a minimum efficiency reporting value (MERV). The MERV is a single number that simplifies the filter selection process by providing the specifier, or the user, a single value of specification for filter selection. For most filters that use mechanical principles of filter operation, this number will most likely be a minimum value at installation and throughout the life of the filter.

### Particle Size Ranges of Standard 52.2

Range	Lower Limit (microns)	Upper Limit (microns)
1	0.30	0.40
2	0.40	0.55
3	0.55	0.70
4	0.70	1.00
5	1.00	1.30
6	1.30	1.60
7	1.60	2.20
8	2.20	3.00
9	3.00	4.00
10	4.00	5.50
11	5.50	7.00
12	7.00	10.00

Unfortunately, filters that use the principle of electrostatic attraction can 'fool' the test by providing a high MERV during the test, but due to the loss of electrostatic attraction during operation, a much lower value during application. The user may not be getting the particle removal efficiency that they originally specified.

Multiple studies have shown that coarse fiber media (charged synthetic media), unlike fine fiber media (fiberglass media), perform differently in real-life applications. Coarse fiber media depends on an electrostatic charge to achieve the published filter efficiency. As atmospheric air passes through the filter, with 99% of the particulate less than 1.0 micron in size, this very fine particulate will dissipate the charge, and the filter quickly loses efficiency.

Appendix J incorporates a non-mandatory filter-conditioning step to replace the 30 grams loading of ASHRAE dust that was defined in ASHRAE 52.2:1999 as the conditioning step. The revised standard will challenge the filter using a KCl (potassium chloride) conditioning method that closely mimics the aerosol size particle distribution that air filters will commonly experience when operated in "real-life" conditions.

This will provide air filter users and specifiers an additional value so they can further ensure the filter's performance for the intended application.

Filters that use fine fiber media operate on mechanical principles of particle removal, including impingement and diffusion. They do not lose efficiency over time, and typically, their rated MERV will be the MERV obtained when testing, using the optional method in Appendix J.

The user or specifier may take comfort that the published efficiency of the filter will be consistent throughout the life of the filter.

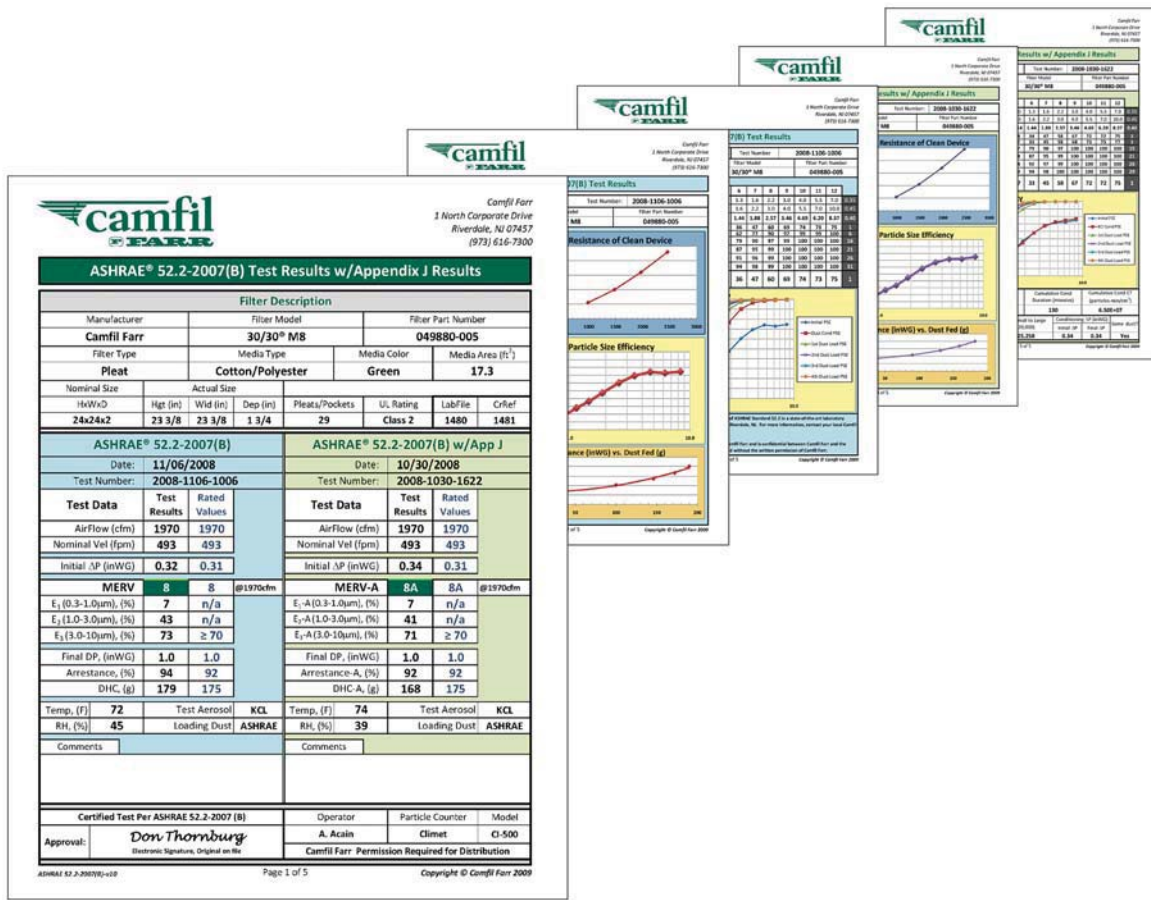
#### Importance of Change

The Appendix J conditioning step will allow manufacturers to show both test procedure results on reports and product literature. Users can access this information, or have filters tested at independent test laboratories, to judge air filter selection and specification for optimum air quality and equipment protection.

ASHRAE Research Project 1189 showed that using the KCl conditioning step closely replicated real-life filter performance. Thus, in the revised standard, if a filter shows a different MERV value between the standard test and the optional Appendix J test, it is safe to assume the Appendix J rating will be closest to the actual efficiency performance value the filter will deliver in real-life application.



Product Performance Barometers  
Camfil ASHRAE Test Report (all 5 pages shown)



How to read an ASHRAE 52.2 test report

1. Check the date of the test. Reports before 2008 may not have been run under the exact conditions specified in the updated Standard.
2. Was the filter operated at the proper velocity? For a 24" by 24" filter, the velocity should be 1970 cfm. For other sizes, the cfm should be relative to the increase or decrease in filter dimensions.
3. What was the MERV per the Standard?
4. What was the MERV-A, noted under conditioning step? It should be the same as the tested MERV.
5. Is a particle size versus efficiency graph shown, through all testing sizes?
6. Is there a chart of resistance versus airflow of the filter, under clean conditions?

MERV	Typical Contaminant	Typical Application
13 thru 16	0.30 to 1.0 micron. All bacteria, most tobacco smoke, droplet nuclei, cooking oil, copier toner, face powder, paint pigment	Hospital inpatient care, general surgery, smoking lounges, superior commercial buildings
9 thru 12	1.0 to 3.0 microns. Legionella, lead dust, milled flour, coal dust, auto emissions, nebulizer drops, welding fumes	Superior residential buildings, better commercial buildings, hospital laboratories
5 thru 8	3.0 to 10 microns. Mold, spores, hair spray, cement dust, snuff, powdered milk	Commercial buildings, better residential buildings, industrial workplace, paint booth inlets
1 thru 4	Larger than 10.0 microns. Pollen, Spanish moss, dust mites, sanding dust, paint spray, dust, textile fibers, carpet fibers	Minimum filtration, residential, window air conditioners

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# HEPA Filter Testing

## HEPA/ULPA Cleanroom Filter Testing in Camfil Facilities

### Filter Classifications

Quite a few inaccuracies and erroneous "jargon" are commonplace in the high efficiency filtration industry. One of the key issues pertains to nomenclature (i.e., HEPA, ULPA, VLSI, SULPA, etc.). This issue involves misconceptions regarding a filter's efficiency and the relationship to particle size.

CEN, the *Comite European de Normalization*, has developed a Standard, EN 1822-1:1998, based on particle counting at the Most Penetrating Particle Size (MPPS). This European Standard applies to High Efficiency Particulate Air (HEPA) and Ultra Low Penetration Air (ULPA) filters used in the field of ventilation and for technical processes (e.g., for clean room technology or applications in the nuclear and pharmaceutical industries).

Key definitions from this Standard include:

**Penetration** — the ratio of the particle count downstream of the filter to the particle count upstream.

**Efficiency** — the ratio of the number of particles captured by the filter to the number of particles challenging the filter.

**Overall Efficiency/Penetration** — the efficiency/penetration averaged over the "superficial/useable" face area of a filter element under given operating conditions of the filter.

**Superficial/Useable Face Area** — the cross-sectional area of the filter element, through which the air passes.

**Local Efficiency/Penetration** — the efficiency/penetration at a specific point on the superficial/useable face area of the filter element under given operating conditions of the filter.

**Leak Threshold** — local penetration greater than or equal to five (5) times the filter's overall penetration.

Filter Class	Overall Value %Efficiency	Overall Value %Penetration	Local Value % Efficiency	Local Value %Penetration
H 10	85	15		
H 11	95	5		
H 12	99.5	0.5		
H 13	99.95	0.05	99.75	0.25
H 14	99.995	0.005	99.975	0.025
U 15	99.9995	0.0005	99.9975	0.00025
U 16	99.99995	0.00005	99.99975	0.000025

*This Standard allows a classification of filters in terms of efficiency and is, therefore, useful for both buyer and seller.*

## Basic Test Protocols

### Leak Scanning

Camfil leak tests each Megalam Panel and Ducted Ceiling Module HEPA/ULPA filter. Testing is performed in Class 100 (M3.5) clean zones within a Class 10,000 (M5.5) cleanroom. All testing is conducted per the controlled and documented procedures of Camfil's ISO 9001 certified quality system.

To enhance upstream sampling capability, leak-scanning systems are equipped with dilution equipment for measuring high particle concentrations. Probe geometry has been optimized to maximize traverse rate and eliminate undetected leaks while maintaining isokinetic sampling. The entire face of the filter is scanned with overlapping strokes, including the media to frame interface. Per customer requirements, Polystyrene Latex Spheres (PSL) is Camfil's standard challenge aerosol.

Any leak with a penetration exceeding five (5) times the filter's average rated penetration, is repaired with an alcohol based silicone sealant per industry standards or customer specifications. Polyurethane and other repair materials are available upon request.

Menu-driven, computer controlled auto-scanning is utilized for standard filter configurations. Manual scanning is performed for small quantity, custom filter designs/sizes and leak repair.

### Filter Media Efficiency Testing

Per Camfil raw goods supplier specifications, suppliers are required to test each master roll of Camfil filtration media for efficiency, utilizing Condensation Nuclei Counters (CNC) & Q127 Penetrometers. Test results are submitted to Camfil for review & material acceptance prior to release authorization.

### Filter Efficiency Testing

**Manual Scan:** Camfil's computer integrated system gathers efficiency information from a fully encapsulated filter. The system features simultaneous upstream and downstream data collection. If the efficiency is lower than specified, the filter is rejected.

**Auto-Scan:** The discrete data points generated during the scan test are integrated to calculate the test filters global efficiency. If the efficiency is lower than specified, the filter is rejected.

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## Product Performance Barometers

## Filter Media Pressure Drop Testing

Per Camfil specifications, approved suppliers test each lot of media for pressure drop. Test results are submitted to Camfil for review & material acceptance prior to release authorization.

## Filter Pressure Drop Testing

**Manual Scan:** During the test, the system continuously monitors and collects filter pressure drop data. If the pressure drop is higher than specified, the filter is rejected.

## Manual Scanning Protocol

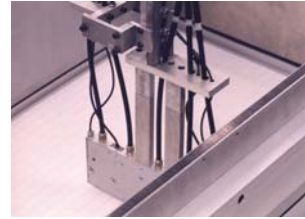
Depending on customer requirements, either Photometer or Particle Counter manual scanning techniques are utilized. Typically, depending upon the detection equipment selected, a solid aerosol (i.e., PSL - Polystyrene Latex spheres) is used. Probe geometry has been optimized to maximize traverse rate and eliminate undetected leaks, while maintaining isokinetic sampling. A summary of Camfil's manual scanning protocol follows:

- 1) Typical test aerosol concentration is: PSL (Polystyrene Latex)  $> 5 \times 10^7$  N/ft<sup>3</sup>
- 2) Typical scan speed is 1.5 – 2.0 inches/second.
- 3) Testing: The entire face of the filter is scanned with overlapping strokes, with particular attention given to the media pack to frame seal.
- 4) Leak Repairs: If a leak exceeds the specification, it is repaired with a silicone sealant. Alcohol-based silicones and polyurethane are also available for use as leak repair materials. After a repair has been made, the entire filter face is re-scanned.

**Particle Counter Scanning:** If a particle count is detected, the operator checks the area for continuous counts. If continuous counts in excess of the specified leakage threshold are detected, the leak is repaired.

**Photometer Scanning:** If a discernable displacement of the % Penetration indicator occurs, or the alarm sounds, the operator re-checks the area of concern. If the % Penetration indicator displacement exceeds the specified leakage threshold, the leak is repaired.

Photometer scanning is generally reserved for HEPA filters, while Particle Counter Scanning is used for ULPA filters and/or for customers with stringent outgassing requirements.



## Auto-Scan Testing

Camfil Auto-Scanners have been designed to detect pinhole leaks in HEPA/ULPA filters. The test apparatus is an automated, computer-controlled system, utilizing multiple particle counters for accuracy.

Polystyrene Latex (PSL) is the standard challenge aerosol. To further enhance system sensitivity, Camfil uses advanced dilution equipment for measuring high upstream particle concentrations. The automated system eliminates the possibility of incorrect test results that can result from human error. The computer interface controls filter airflow rate, test aerosol injection, particle counting upstream and downstream of the test filter, probe traverse rate, data reduction and data storage. A description of system parameters follows:

## 1) System protocol includes:

- a) Aerosol Concentration: PSL concentration =  $3 \times 10^8$  N/ft<sup>3</sup> (typical)
- b) Particle Counter Flow = 1 CFM (cubic foot per minute)
- c) Sampling = Isokinetic
- d) Sample Time = Continuous
- e) Size Range = 0.1 - 0.5  $\mu$ m (0.1  $\mu$ m band widths)

## 2) Required operator input:

- a) Min./Max. and Rated Efficiency
- b) Leakage factor (per customer specification)
- c) Dilution ratio
- d) Min./Max. and Rated Pressure Drop
- e) Continuous upstream sampling during the scan process
- f) Programmed to automatically traverse the filter with overlapping strokes. Proximity sensors (mounted in the probe) monitor the probes location with regard to the clamping frame, ensuring that the probe overlaps the media to frame interface along the filters perimeter.
- g) The system utilizes the rated efficiency, leakage factor, and dilution ratio inputs, comparing downstream samples from the entire scan with the average upstream sample, to determine if a leak exists.
- h) If a leak is detected, a reject report is generated that indicates the magnitude and location of the leak.
- i) Measuring pressure drop continuously across the filter. If the pressure drop is higher than specified, the filter is rejected.
- j) Calculating global efficiency by integrating the discrete data points collected during the scan test. If the efficiency is less than specified, the filter is rejected.

## Product Performance Barometers

The scan rate is calculated per IEST-RP-00001.3 Section 9.2.2:  $Sr = CcLsFsDp / (60NI)$ .

Where:

- $C_c$  is the challenge concentration in particles/ft<sup>3</sup>
- $L_s$  is a significant leak in terms of standard penetration
- $F_s$  is the sample flow rate in cfm
- $D_p$  is the probe dimension expressed in inches, parallel to the scan direction
- NI is the number of particle counts that define the maximum leak
- 60 is the conversion factor from seconds to minutes.

Camfil specifies that the variable NI is to be set to twice the particle counter background level or a minimum of 25.



HEPA filter with label of test results.

### Camfil's Cam Count Efficiency Testing Protocol

Camfil's Cam Count efficiency test system is designed to test HEPA/ULPA filters per IEST-RP-CC007.1 and EN1822. All testing is performed per the controlled & documented procedures of Camfil's ISO 9001 certified quality system.

Camfil's Cam Count efficiency test system has been designed to measure the overall efficiency and pressure drop of HEPA/ULPA filters. The test apparatus is an automated, computer controlled system, utilizing a single laser particle counter for accuracy. Poly Alpha Olefin (PAO) is the standard challenge aerosol.

A Polystyrene Latex Sphere (PSL) test aerosol is also available upon request and is utilized on all high temperature filters. To further enhance system sensitivity, Camfil uses advanced dilution equipment for measuring high upstream particle concentrations. The automated system eliminates the possibility of incorrect data that can result from human error.

The computer interface controls the flow rate, the test aerosol injection, particle counting upstream and downstream, and data collection, reduction, and storage. A description of system parameters follows:

1) System protocol includes:

- Aerosol Concentration: PAO concentration =  $3 \times 10^8$  N/ft<sup>3</sup> (typical) PSL concentration =  $1.3 \times 10^8$  N/ft<sup>3</sup>
- Particle Counter Flow = 1 CFM (cubic foot per minute)
- Sample Time = 20 second upstream & downstream sequentially
- Size Range = 0.1 – 0.5 mm, 0.1 – 0.2 mm, 0.2 – 0.3 mm, 0.3 – 0.5 mm, and > 0.5mm.

2) Required operator input:

- Minimum, maximum, & target efficiency
- Minimum, maximum, & target pressure Drop
- Test flow rate

3) System Operation: The system sequentially measures the upstream & downstream particle concentration. After applying the dilution ratio to the upstream concentration, it calculates the filter efficiency, while simultaneously measuring the filter pressure drop, using a calibrated pressure transducer. These values are automatically compared to the input minimum & maximum values. A filter with values outside the specified range is rejected. The system automatically generates a test label that includes the test results for each passing filter.

### UL 900

Camfil Megalam Panel and Ducted Ceiling Module type HEPA/ULPA filters are listed with Underwriters Laboratories per UL 900, "Standard for Test Performance of Air Filter Units".

### References:

- Printed copies of referenced documents may be purchased from the following entities:
- CEN, European Committee for Standardization, 36 rue de Stassart, B - 1050 Brussels, Tel: + 32 2 550 08 11; Fax: + 32 2 550 08 19
- IEST, Institute of Environmental Sciences and Technology, 5005 Newport Drive, Suite 506, Rolling Meadows, IL 60008, Phone: (847) 255-1561; Fax: (847) 255-1699



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## UL Filter Testing

Air filters have always presented many numbers that users incorporated in their evaluations; including dust spot efficiency, arrestance, dust holding capacity, minimum efficiency reporting value (MERV) and various others. The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) greatly simplified the selection process when they introduced MERV. This value supplied the user with the filters' minimum particle capture efficiency ensuring that the filter would provide the protection level required for the process or to protect building occupants in specific applications. In 2007 they also added Appendix J, an additional testing step designed to expose filters that may not maintain their efficiency over time.

Now Underwriters Laboratories (UL) has simplified their Standard UL 900, for evaluating a filters' combustibility and smoke generation when the filter is exposed to direct flame. The designations UL Class 2 and UL Class 1 are no longer. UL 900 covers both washable and throwaway filters, used for the removal of dust and other airborne particles from mechanically circulated air in equipment and systems.

The vast majority of air filters have historically tested as UL Class 2. The criterion for this type of filter is that when tested, the air filter, when clean, burns moderately when attacked by flame, or emits moderate amounts of smoke, or both. A UL Class 1 filter was an air filter which, when clean, did not contribute fuel when attacked by flame and emitted only negligible amounts of smoke. Some municipalities required the UL Class 1 product through their local code. In many cases, because of the different components of construction between Class 1 and Class 2 rated products the user experienced premium costs of two to three times the cost of a UL Class 2 product. Additionally there was some confusion in engineering circles that a UL Class 1 product was a 'fireproof' product. This was not the case as a Class 1 product could burn if submitted directly to an open flame, but was less likely to contribute combustion byproducts. Both classes, when clean, would self-extinguish when the flame source was removed from contact with the filter.

It is important to note, after a period of service, the combustibility and smoke generation of an air filter will depend upon the nature and quantity of the material collected by the filter. The test requirements of this Standard, for classification purposes, applies only to air filters in a clean condition. This is a critical step forward as UL as a recognized leader in independent safety certification facilitated a simplified, cost-conscious revision.



*Camfil 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 printing includes the UL class of either UL Class 1 or UL Class 2. The logo is a registered trademark of Underwriters Laboratories.*

# Energy Cost Index (ECI)

Rising energy costs weigh heavily on every company's bottom line. To cut a building's energy costs, consider selecting filters based upon their energy use over their life in the system.

Although you may be tempted to pick an inexpensive filter to cut costs now, tests show that it will increase utility bills, and air quality will suffer. The facility will actually be spending much more in the end. This does not even include duct cleaning, coil cleaning, and additional facility maintenance costs that result from failed filters.

For a lower total cost of ownership, choose a high-quality filter that will do it all — run efficiently, clean the air thoroughly, and last longer. The advanced ECI system simplifies the selection process. The index factors in multiple air handling and filtration variables to identify the highest quality filters with the lowest cost of ownership.

### ECI Derivation

The Energy Cost Index value is calculated using life cycle cost modeling software that has been used and validated with real-

life testing for over 15 years. The calculated value is then converted into a star rating, with the highest star value translating to the lowest energy consumption. This data is available for products of all manufacturers.

The Energy Cost Index is an easy way to compare the energy efficiency of our filters, and a competitor's filter, so you can choose the one that offers the best value. Based upon a five star scale, the Energy Cost Index is an indicator of what a filter will cost over its lifetime. The best rating — five stars — indicates that the filter is one of the most energy-efficient, longest-lasting filters available. The energy savings from star level to star level can be significant. The chart to the right notes average filter energy use in dollars by star value. Five stars should be your selection if you are seeking the most cost-effective filter.

Throughout the HVAC grade product pages in this catalog, we have placed a logo with the appropriate number of stars for the listed product.

Contact Camfil for ECI information on our products and other industry offerings.

Star Value	Final Filters	Prefilters
5-Star	\$56.00	\$104.00
4-Star	\$95.00	\$111.00
3-Star	\$132.00	\$121.00
2-Star	\$181.00	\$125.00
1-Star	\$227.00	\$135.00

The above chart provides a relative comparison of the cost of energy to move air through the levels of star rated filters. Using a 5-Star final filter as opposed to a 1-Star final filter can save a facility up to \$171.00 per year at 10¢ a kWh. Your system will vary based upon local kWh cost and system airflow.



A 5-Star value uses the least energy to move air through the filter. A 1-Star uses the most energy to move air through the filter.



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## Filter Service

The same variables that affect filter design and selection also contribute to the problem of determining when a filter has reached its effective life span as the result of the accumulation of contaminants. Determining this point accurately is important, in view of current replacement filter cost and energy considerations. Replacing the filter too soon increases the expense of system maintenance. Replacing the filter too late wastes energy because dirty filters increase energy. Late replacement also increases the possibility of unloading of contaminants, either because of filter design or because of filter failure.

Because of wide variations in the contaminant load of the air being filtered, time is an uncertain measurement for judging when filters require service. Because many contaminants are too small to be seen by the naked eye, visual inspection tells us little or nothing about the filters need for maintenance. Proper servicing of HVAC filtration products requires an instrument to measure the pressure drop across the involved filters. Manometers or magnehelic pressure differential gauges should be used to determine the proper point to replace filters.



A manometer is a U-tube device that measures the pressure applied to an indicating fluid. As pressure, either vacuum or positive, is exerted, the level of fluid changes accordingly and is viewed on a graduated scale. The fluid in a manometer is a petroleum-based oil with carefully controlled, specific gravity. There are variations of this type of gauge.

The most common resistance measurement device in the HVAC industry is called an inclined manometer and is in the configuration of an 'L', tipped on an angle. Another type of gauge found on HVAC systems is a 4" round magnehelic. A magnehelic gauge operates under the same principle as the U-tube manometer, except that it relies upon mechanical parts to sense pressure differential. Scales may read 0" – 5.0", 0" – 1.0", 0" – 2", or higher. Graduations are usually in one tenth increments.



Both items sense pressure differential through plastic, rubber, or metal tubing, attached to special static pressure tips inside the air handling system. Proper systems also include gauge cocks to allow shut off while the instrument is being calibrated. Some systems allow measurement of the entire system filter bank, sometimes encompassing more than one stage of filters. New systems now incorporate facilities for reading pressure drop across prefilters and final filters together, or separately. This may involve separate gauges or working with a series of valves.

Maintenance and filter change-out should be performed only when a system is shut down, to avoid re-entrainment and system exposure. Proper filter inspection includes the following:

1. Turn both gauge cocks, or remove both sensing tubes, so the gauge is open to the atmosphere. Calibrate with calibration knob or adjustment screw to zero (0).
2. Check the tubing and static tips for dust accumulation. Replace tips or tubes, if necessary, or remove accumulation.
3. Re-install tubing or open gauge to the system. Note system pressure drop across the filters.
4. Replace filters if static pressure reading exceeds that of the original equipment replacement criteria. Note, the original design static for replacement of filters may not coincide with that of the filter manufacturer's literature. In most cases, the manufacturer is publishing the highest recommended final pressure drop, a level rarely experienced in actual application.

Many systems incorporate lower velocities to increase filter life. Check with your filtration supplier if you have reservations concerning the proper replacement point. If original design data is not available, a good rule of thumb is to change the filters when their initial pressure has doubled. Decals or labeling should be attached to the unit, noting applicable equipment data, area serviced, types of filters, rated efficiencies, and date of last inspection or change.

If many HVAC units are involved in one facility, it may be advantageous to use a portable magnehelic gauge. In this case, static tips, tubing, and an area of connection would be installed on the HVAC unit. The HVAC mechanic would use a portable magnehelic gauge in periodic rounds of inspection. The advantages to this type of system are:

1. The portable gauge is calibrated before inspection rounds, assuring proper readings.
2. A log may be contained within the case of the portable, denoting results of inspections and recommendations.
3. The initial cost of placing gauges upon all involved units is eliminated, except for the minimal investment in tubing and static tips.

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## Filter Service

Proper maintenance, including monitoring of filter efficiency and system integrity, is critical to ensuring HVAC systems operate as intended. The change-out schedule for various filter types may be significantly different. Ideally, you should determine the change-out schedule for electrostatic filters by using optical particle counters or other quantitative measures of collection efficiency. Collecting objective data (experimental measurements), will allow you to optimize electrostatic filter life and filtration performance. The data should be particle-size selective so that you can determine filtration efficiencies that are based on particle size (e.g., micrometer, sub-micrometer, and most penetrating size). If using mechanical filters, a manometer or other pressure-sensing device should be installed in the mechanical filtration system to provide an accurate and objective means of determining the need for filter replacement. Pressure drop characteristics of both mechanical and electrostatic filters can be supplied by the filter manufacturer.

Wear appropriate personal protective equipment when performing change-out.

Recent laboratory studies have indicated that re-aerosolization of bioaerosols from HEPA filters is unlikely under normal conditions [Reponen et al. 1999; Gwangpyo et al. 1998]. These studies concluded that biological aerosols are not likely to become an airborne infectious problem once removed by a HEPA filter (or other high-efficiency filter); however, the risks associated with handling contaminant loaded filters in ventilation systems, under field-use conditions, needs further study.

Usually, prefilters are not in a system for such an extended period of time wherein they would be a concern. Final filters, MERV 13 and higher, can be in a system for a period of years and therefore, may be more conducive to a large contaminant volume.

Persons performing maintenance and filter replacement on any ventilation system that is likely to have hazardous contaminants should wear appropriate personal protective equipment (respirators, gloves, etc.). For example, the Centers for Disease Control and Prevention (CDC) recommends NIOSH-approved 95% efficient, non-oil mist environment (N95) respirators and gloves for a worker performing filter maintenance in a health care setting, where the spread of tuberculosis is a concern.

Treat disposed filters with the respect for the contaminants that they may contain.

## Additional Points to Remember

1. Pleats should be in the vertical position for longer filter life.
2. Filters should fit tightly in holding mechanisms, a ¼" gap around a 24" by 24" filter is the equivalent of a 3" hole in the middle of the filter or 18% untreated air bypass. Make sure you are obtaining the filter efficiency you require by ensuring that all of the air seen by the filter is treated by the filter.
3. Use the filter fasteners recommended by the manufacturer to hold the filter securely in the holding mechanism. Use the proper number of fasteners.
4. Bag filter pocket length should be selected based upon proper velocity through the filter to properly inflate pockets. Pockets that are too long will not inflate properly, and pockets that are too short will have a high resistance to airflow. Rule of thumb: 21" pockets for 350 fpm, 30" deep pockets for 500 fpm, and 36" deep pockets for 625 fpm (based upon an 8-pocket filter). Review manufacturers' literature for other pocket configurations.
5. Filters cannot operate properly when wet. Although intermittent wetting is acceptable, constant wetting will compromise the integrity and efficiency of the filter. Use moisture eliminators or eliminate the source of the wetting.



µm	Micrometer or micron, one-millionth of a meter.
ACFM - Actual Cubic Feet Per Minute	This is a measure of airflow referenced to the current density of the gas. The mass flow rate of the air equals the ACFM multiplied by the air density.
Adsorption	Activated carbon is a porous, sponge-like substance which is capable of collecting and retaining many odor-bearing gas/vapor phase chemical compounds. The surface area of activated carbon is very large and consists of one surface layer and a submicroscopic pore structure. This pore structure is also known as the macropore and micropore wall surfaces. Molecules and atoms from the surrounding atmosphere are attracted and collected on these surfaces. The manufacture of an activated carbon is achieved by burning these submicroscopic holes into the carbon structure at 1000° C.
Aerosols	Solid and liquid airborne particles, typically ranging in size from 0.001 to 100 µm.
Approach Velocity	The actual velocity of the air as it approaches the filtration bank. Approach velocity can be determined by dividing the cfm of a system by the area of the filter bank opening. A 20,000 cfm system with a filter bank opening 10 feet high, by 10 feet wide (an area of 100 sq. ft.), would have an approach velocity of 200 feet per minute. 20,000 cfm = 200 fpm x 100 sq.ft.
Arrestance	Gravimetric efficiency on an ASHRAE test dust that provides a value for a filter's ability to capture contaminant by weight. Has value when considered for filters in the MERV 1-4 range of ASHRAE Standard 52.2-2007.
Atmospheric Air Contaminants	Atmospheric air can be very dirty with concentrations of up to 10,000,000 particles per cubic foot, and rural areas are only about 50% better than industrialized cities. This equals 1 ton of settled contaminant per cubic mile, or 500 tons per square mile per year.
Bioaerosols	An airborne suspension of particles of biological origin.
Breakthrough Concentration	Saturation point of downstream contaminant buildup, which prevents the collection ability of a sorbent to protect against gases and vapors.
Brownian Motion or Movement	As particle sizes decrease below 0.3 micron, their movement in the air stream, both direction and velocity, are influenced more by collisions with the molecules that make up the fluid or air in which they are captive. These particles do not follow the trained arrows of the designers' drawings, but instead, move in an unpredictable, random direction, battered back and forth, in a vain attempt to follow the air stream itself. It is easy to imagine how a particle of sub-micron size can stay in suspension in a particular space indefinitely.
Bypass (Filter Bypass)	A reference to the unfiltered air going around the filter because it has not been properly sealed in place.
Capacity	The volume of air (cfm) which can be delivered through a filter unit.
Celsius (Centigrade)	A thermometric scale in which the freezing point of water is 00 and its boiling point is 1000 at normal atmospheric pressure (14.696 PSI).
cfm (cubic feet per minute)	A measure of the volume of air being used in a system. An air handling system rated at 20,000 CFM would have a volume of air equal to 20,000 cubic feet entering the plenum every minute. CFM = FPM x Sq. Area.
Change of State	Change from one phase, such as solid, liquid, or gas, to another.
Chemisorption	Removal of gases from the airstream by the chemical reaction of the gas with an impregnant on the surface of, or distribute throughout the absorbant or carrier.
Chimney-Effect	The tendency of heated air to rise, due to lower density, in comparison with ambient, also called thermal updrafts. In clean room area, heat generating equipment may cause severe upward air currents, resulting in unwanted turbulence.
Cleanroom	A specially constructed, enclosed area environmentally controlled with respect to airborne particulate, temperature, humidity, air pressure, airflow patterns, air motion and lighting.
Clean Space	A term referring to cleanrooms or workstations within a room.
Collection Efficiency	Fraction of entering particles that are retained by the filter (based on particle count or mass).
Contaminants	Airborne dirt, dust, spores, viruses, bacteria, and allergens, which are sometimes referred to as aerosols. They may also be molecular in size and are then referred to as gaseous contaminants.
Conventional Flow (Non-Laminar Flow) Clean Room	A cleanroom with no requirements for uniform airflow patterns and air velocities.
Critical Surface	The surface in a cleanroom or workstation to be protected from particulate contamination.
Damper, Multiple Louver	A damper having a number of adjustable blades.
Δp - (Delta P)	A Greek symbol designating the difference in total air pressure between two points. Generally measured at the inlet and outlet of a filter. Normally measured in inches water gauge (in W.G.).



## Filter Industry Definitions

Depth Loading	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. Progressive density medium has superior dust holding capability.
Diffuser	An air distribution outlet specifically designed to mix conditioned air with room air by induction. Mixing is accomplished by venturi action as the high velocity air stream leaving the diffuser aspirates ambient air toward the device.
Diffusion	A method of filtration that is effective on particles 0.1 micron and smaller. Their direction and velocity are influenced by molecular collisions (called "Brownian movement"). Particles of size do not follow the air stream 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).
Disposable	Refers to an expendable component or assembly which is discarded and replaced with a new unit when completely loaded.
D.O.P. (Diocetyl Phthalate)	An oil-like plasticizer which is readily atomized to form the 0.3 micron test aerosol used in overall penetration and scan tests of HEPA filters (extinct test).
Downstream	That portion of the system located after the filter. Also, the leaving air or the clean air side of a filter.
Dry Laid Media	Media fibers assembled in a media blanket, 1/8" to 3/8" thick.
Dust Holding Capacity	The total weight of ASHRAE test dust a filter can hold before reaching a given final resistance. The amount will vary depending on the size and design of the filter and airflow rate. Reported in grams, or grams per square foot. May provide a relative measure of filter service life in low efficiency filters.
Efficiency	In general terms, efficiency is the degree to which a filter will perform in removing solids. Specifically, it refers to any of three filter tests: ASHRAE 52-92 Arrestance, ASHRAE 52-92 Atmospheric Dust Spot, or DOP Penetration.
Electret	Filter media to which an electrostatic charge is applied during its formation.
Electrostatic Filter	A filter that uses electrostatically enhanced fibers to attract and retain particles, usually decreases in efficiency over time.
Electrostatic Precipitation	A method of filtration that imparts a positive charge to airborne particulate matter and collects the particles on negatively charged collection plates.
E.T.L.	An independent testing laboratory for various types of air filters and equipment, now known as Intertek Testing.
Exfiltration	Air flow outward through a wall, leak membrane, etc.
Exhauster	A fan used to withdraw air under suction.
Extended Surface Filter	A category of filter that is designed with pleats or pockets to increase the amount of media exposed to the air stream within a given face dimension. Greater filter surface area reduces media velocity and increases efficiency, and dust holding capacity.
Fan	An air-moving device comprising a wheel or blade, and housing or orifice plate.
Fan, Centrifugal	A fan rotor, or wheel, within a scroll-type housing. It may be either belt drive or have a direct motor connection.
Fan Coil	A terminal unit consisting of a finned tube coil and a fan in a single enclosure
Fan Laws	Equations used to calculate fan flow, pressure, and power at different fan speeds, different air temperatures, and different air pressures.
Fan, Propeller	A propeller, or disc-type wheel, within a mounting ring or plate. It includes the driving mechanism supports for either belt drive or direct connection.
Fan, Tubeaxial	Propeller, or disc-type wheel, within a cylinder. It includes the driving mechanism supports for either belt drive or direct connection for moving air.
Face Area	The area of an air filter or other air treatment device normal to the flow of air through it.
Face Loading	The phenomenon by which contaminants in the air load up on the surface of the filter media, causing an abnormal rise in resistance.
Fan, Vaneaxial	A disc-type wheel within a cylinder, a set of air guide vanes located either before or after the wheel. It includes driving mechanism supports for either belt drive or direct connection.
Fiber Break-Off	Particles of the media fiber breaking off and entering the air stream, thereby becoming contaminants.
Fiberglass	A term used to describe filter medias made with coarse or fine glass fibers.
Filter Bypass	Airflow around a filter or through an unintended path.
Filter Face Velocity	Air stream velocity just prior to entering the filter.
Final Filters	The last and most effective filter in a multi-stage progressive filtration system.
Final Resistance	The maximum recommended pressure drop across a filter. Used as an indicator as to when a filter should be changed. Expressed in "inches w.g.", may or may not be synonymous with final pressure drop.

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## Filter Industry Definitions

Filter	A term generally applied to a filter used to remove airborne particulate from the air. A filter may be one of many types, such as panel, automatic self-renewable, extended surface, HEPA, or electrostatic. The term "filter" is sometimes erroneously used to describe a media used inside the device.
Filter Media	Material that makes up the filter element. Glass, cotton, synthetic or cellulose fibers are examples of filter media types.
fpm (feet per minute)	The speed (velocity) of the air at a given point in the air handling system. $fpm = cfm - Area$ .
Fresh Air	Outdoor air introduced into a system.
Gas	Formless fluids which tend to occupy an entire space uniformly at ordinary temperatures.
Gas-Phase Filter	Composed of sorbent medium, e.g., natural zeolite, alumina-activated carbon, specialty carbons, synthetic zeolite, polymers.
Gel Seal	In cleanroom panels, the two compound silicone-sealing material in the downstream casing sides of knife-edge modules to effect a seal. Can be any color, but blue is the most popular.
HEPA	"High Efficiency Particulate Air" capable of removing a minimum of 99.97% of 0.3 micron DOP smoke particles from a test concentration of 80 micrograms per liter.
High Efficiency	Normally considered MERV 9 to MERV 15 (ASHRAE 52.2-2007).
Humidity	Water vapor within a given space.
Humidity, Relative	The ratio of the mole fraction of water vapor present in the air to the mole fraction of water vapor present in saturated air, at the same temperature and barometric pressure. Approximately, it equals the ratio of the partial pressure or density of the water vapor in the air to the saturation pressure or density, respectively, of water vapor at the same temperature.
Impingement	A method of filtration, effective on particles, with sufficient inertia to cause them to leave the air stream and collide with a fiber. Often referred to as viscous impingement, where fibers are coated with an adhesive.
Inch of Water	A unit pressure equal to the pressure exerted by a column of 1" high liquid water.
Inches - w.g.	Abbreviation for "inches - water column gauge". Method of reporting filter resistance (or pressure drop of a filter).
Infiltration	Air flowing inward through a wall, leak, etc.
Initial Resistance	Differential pressure across a clean filter. Expressed in inches W.G. Synonymous with initial pressure drop.
Interception	A special case of the impingement method of filtration that does not depend on the inertia of particles to bring them in contact with a fiber. Interception occurs when a particle follows the air stream, 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	The points where two microfibers in filter media intersect.
Knife-Edge Seal	A narrow point where the peripheral sealing surface of a filter or filter frame provides a seal compression of a sharp edge into a gel.
Laminar Airflow	Airflow in parallel uniform lines, with uniform velocity and minimum eddies.
Laminar Flow Cleanroom	A cleanroom where a requirement for laminar airflow is usually 20 FPM.
Life Expectancy	The service life of changeout interval of a filter cartridge. Even with known dust holding capacity, the useful life will vary according to type and size of contaminants and particle distribution entering the filter on makeup air or 100% outside air systems.
Life-Cycle Cost	Sum of all filter costs from initial investment to disposal and replacement, including energy and maintenance costs.
Loft	Thickness and surface irregularity of filter media.
Low Efficiency	Considered MERV 1 to MERV 5 (ASHRAE 52.2-2007). Examples: Coarse fiberglass media, layered metal screens, standard polyester, roll filters.
Makeup Air	Outside air introduced to the HVAC system for ventilation, pressurization, or to replace exhausted air quantities.
Mass Transfer Zone	Adsorbent bed depth required to reduce the chemical vapor challenge to the breakthrough concentration.
Maximum Allowable Resistance	Published final pressure drop by manufacturer.
Maximum Differential Pressure	The maximum pressure differential which a filter is required to withstand without structural failure or collapse.
Media	Plural of medium. Materials of which elements are made.
Media Velocity	Speed of air flowing perpendicular to media. Divide total cfm by total media area.
Medium	The porous material through which air is passed to remove particulates. Generally made of fiberglass, synthetic fibers or cellulose. Usually confined within a frame or cell sides, the assembly is referred to as a filter or filter cartridge.

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## Filter Industry Definitions

MERV	Minimum Efficiency Reporting Value, a single number that designates an efficiency level when an HVAC level filter is tested using the practice defined in ASHRAE Standard 52.2, <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i> . Values are MERV 1 through MERV 16. Filters higher than MERV 16 are HEPA filters and are evaluated through a practice prescribed by IEST.
MERV-A	A value, noted as MERV-A, that denotes an air filter's efficiency after an optional conditioning step, prescribed in Appendix J of ASHRAE 52.2. The step simulated how a filter may perform over its life within a system by simulating natural filter loading. A properly performing filter should have a MERV-A equivalent to its rated MERV.
Micron Or Micrometer Symbol - $\mu$	A unit of length in the metric system equal to one millionth of a meter (0.000039 inches). 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.
Migration	The process by which the adhesive or oily substance releases itself from the media fibers, enters the air stream, and becomes a contaminant. Migration may cause clogged coils and dirty ducts as the oil collects in the system, often called entrainment.
Net Effective Media Area	The amount of media area in a filter that is exposed to airflow and usable for collecting airborne contaminants. Opposite of blind spots or dead area. Synonymous with net effective filtering area.
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, which stir the airborne dust particles, keeping them in suspension.
Non-Supported Media	Filters in which the points are extended and supported in the air stream only by the airflow, with no separate media support.
Off-Gassing	Any toxic gas released by a product during operation or combustion.
Packing Density	Ratio of fiber volume to total filter volume.
Panel Filter	A low efficiency filter consisting of a flat sheet of media that is usually contained within a cardboard frame. An alternate design has an internal wire frame, normally made with fiberglass or synthetic media from ½ to 2 inches thick. Generally called throw-a-ways.
Particle Count	In a cleanroom, the quantities of airborne particulate at work levels are monitored periodically during operation. Particle populations per cubic foot are simultaneously recorded for .5 micron and larger sizes. The better particle counters will ingest one cubic foot per minute and record the results. Systematic particle counts are an important tool in maintaining any quality cleanroom.
Particle Size Efficiency	Descriptive value of filter performance, loading based upon specific particle sizes.
Particle Sizes of Contaminants	Average airborne atmospheric dust is approximately 1 - 10 microns; heavy atmospheric dust, such as fly ash, is 10-100 microns. One micron = 1/25,000 inch. A human hair is approximately 75-150 microns.
Particle Distribution of Atmospheric Air	98% of all particles are smaller than 10 microns (invisible to the human eye) when evaluating by count, and 94% of the total particles, by weight, are 10 microns and smaller. The majority of all particulate matter in a standard sample of atmospheric air, whether by weight or by count, are smaller than the eye can see, and are not trapped by low efficiency filters.
Penetration	The leak rate through the filter, penetration is expressed as a percentage based upon a specific particle size. % penetration is the reciprocal of % efficiency. HEPA filters, for example, have a .03% maximum penetration on 0.3-micron particles.
Phosphorous Free	Urethane sealant free of phosphorous components.
Physicochemical Properties	Physical and chemical characteristics of sorbents (pore size, shape, surface area, affinities, etc.). Characteristics of sorbent medium, e.g., pore size, shape, surface area, etc.
Pleated Panel Filter	An extended pleated media filter with media support wire grid and beverage board enclosing frame. The media is a blend of cotton and synthetic fibers, with an ASHRAE efficiency of 25-30%.
Prefilters	A filter placed in front of another filter to remove the larger, heavier particles. Primary purpose is to extend life of the final filters. Prefilters are highly recommended in systems requiring high efficiency filtration, especially where a high concentration of lint is present. Two stages of prefilters are recommended for cleanroom applications.
Pressure Differential/ Drop	The difference in static pressure measured at two locations in a ventilation system, as referenced herein, the difference between the upstream and downstream side of the filter. Usually measured in inches of water, abbreviated as "w.g.".
Pressure, Static	The fan-induced pressure which tends to burst or collapse a duct, which is required to move air through a system. Fans must push and 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.
Rated Capacity	The air volume, usually specified in cfm, which a manufacturer specifies for a specific air filter.
Residence Time	Length of time that a hazardous agent spends in contact with a sorbent or within the capture zone of a filter.



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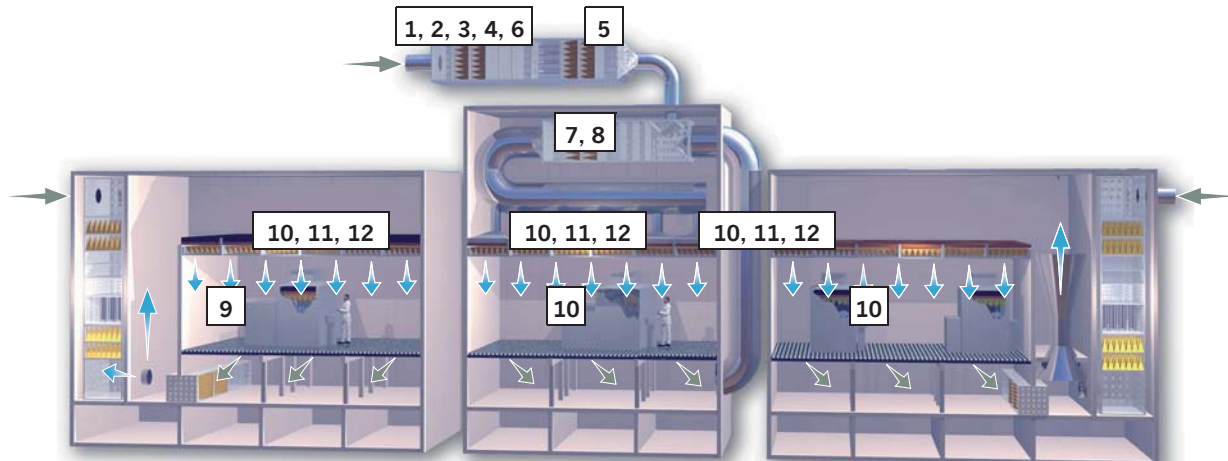
## Filter Industry Definitions

Return Air	Air which has been returned to the plenum from the building for recirculation. A return air duct will generally be found before the filter media where the return air is mixed with incoming fresh air. Also, referred to as RECIRCULATED AIR.
S.B.S. (Sick Building Syndrome)	Building related illness. Illness whose cause is related to conditions inside the building.
Scan Test	Technique for locating pinhole leaks or glue-line defects in HEPA filters by inspecting the entire leaving airside of the filter with an appropriate leak detector. Cold DOP with 0.5-micron diameter particles is used as the challenge aerosol. Cold DOP scan testing may be performed at the factory or on the job site.
Skin Loading	The condition occurring when collected particles build up on the surface of the media, plugging the spaces between fibers. 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	Porous medium that collects gases and vapors only.
Static Pressure	The potential pressure exerted in all directions by a fluid. For a fluid in motion, it is measured in the direction of flow.
Static Tip	Device inserted at right angles to an airstream to measure static pressure.
Steady State	A condition of equilibrium where all things are constant. Aerosol concentrations no longer change once steady-state occurs.
Stoke's Law	A physical law which approximates the velocity of a particle falling under the action of gravity through a fluid. The particles will accelerate 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	Super low penetrating air (filter) with 99.9999% efficiency on 0.12-micron particles.
Supported Media	Filters in which the pleats are supported and separated their full length.
Surface Area (Carbon)	The surface area of granulated activated carbon is determined by the BET method, which utilizes the adsorption of nitrogen at liquid nitrogen temperatures in the calculation. Surface area is usually expressed in square meters per gram of carbon.
Tackifier Migration	The process by which the adhesive or oily substance releases itself from the media fibers, enters the airstream, and becomes a contaminant. Migration may cause clogged coils and dirty ducts as the adhesive or oil collects in the system.
Terminal Module	A sealed, mounted, ducted HEPA filter - not room side replaceable.
Ton of Refrigeration	A useful refrigerating effect equal to 3516 wafts (12,000 BTUH).
Total Pressure	Total pressure is the sum of static and velocity pressure. Not including temperature changes, it is the sum energy potential of liquid or gas.
UI Ratings	Class 1 & 2: Smoke contribution ratings applied to filters by UL test standard 900 (Underwriters Laboratories).
ULPA	Ultra low penetration air (filter) with efficiency of 99.9995% on 0.12 micron particles.
Unloading	The process by which dirt, originally stopped by the filter, is released back into the air stream.
Vapor	The gaseous form of substances that are normally solid or liquid at ambient temperatures.
Vapor Pressure	Partial pressure of a liquid's vapor required to maintain the vapor in equilibrium with the condensed liquid or solid.
Velocity Pressure	Velocity pressure is the energy associated with a liquid or gas, based upon its velocity and density. Velocity pressure is proportional to the square of velocity. It is akin to the kinetic energy of a system.
Ventilation	The process of supplying or removing air by natural or mechanism means to or from any space. Such air may or may not have been conditioned.
V.O.C.'S	Volatile organic components from a variety of furniture finishes, carpets or drapes, cleaning and personal products, that evaporate at room temperatures.
w.g.	See inches water gauge.
Wet-Laid Media	An ultra-fine fiberglass media "paper" used in most mini-pleat filters and all current HEPA types.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

**Microelectronics Recommendations**

Camfil is recognized as the number one supplier of high efficiency filtration products for the microelectronics industry. HEPA/ULPA filters are produced within controlled environments in our ISO 9000 certified plants. We can produce the same type of filters at multiple manufacturing sites. Our large production capacity ensures the availability of our products at all times, throughout the world. Ironically, the cleanliness levels required for production in this industry far exceed those required for medical facilities, or even pharmaceuticals. With wafer fab technology now common at 300mm, they are forever pushing the envelope with regard to contaminant control, both particulate and gaseous. Camfil will be there, supplying filter housings, prefilters, secondary filters, and the highest grade of HEPA filters and ceiling modules.



The above recommendations are based upon existing criterion as published by cognizant authorities, or best practice, based upon published data. Where multiple products are listed that provide the same efficiency, they are listed in order of lowest life-cycle cost. For your specific application, contact Camfil or your local representative or distributor.



1. 30/30



2. Durafil



3. Hi-Flo



4. Riga-Flo



5. Camsorb Canisters



6. Glide/Pack Housing



7. Filtra 2000



8. Absolute (XS)



9. Termikfil



10. Megalam Panels



11. Slimline RSR



12. Megalam Diffusers

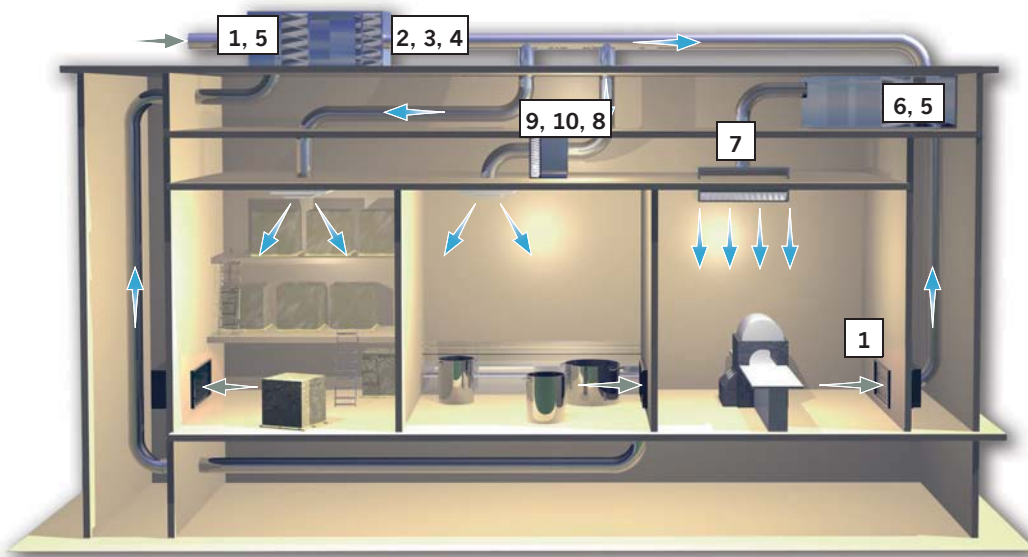
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## Food & Beverage Recommendations

Contamination of food and beverage products is a prime concern for any producer of the products we all purchase daily. In this competitive market, anything that can affect product appearance, taste, aroma, or other attributes may have a debilitating affect on product appeal and the profitability of the producer. Naturally occurring contaminants such as bacteria, nuisance dusts, fungi, yeasts, viruses, organic matter and pollen may be easily removed through the selection of proper air filtration products. Additionally, filters can remove contaminants generated by people, such as particles of skin, dandruff, make-up, and hair and clothing fibers, including contaminants from manufacturing operations such as garments, packaging products, and production operations. Some of these facilities may use efficiencies as high as a HEPA for the production of foods stuffs that include yogurt and mushrooms. For detailed application assistance, please consult factory. Some standard filtration selections are noted below.



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1. 30/30



2. Durafil



3. Hi-Flo



4. Riga-Flo



5. Glide/Pack



6. Camsorb Canisters



7. Slimline RSR



8. Magna/Pack



9. Filtra 2000



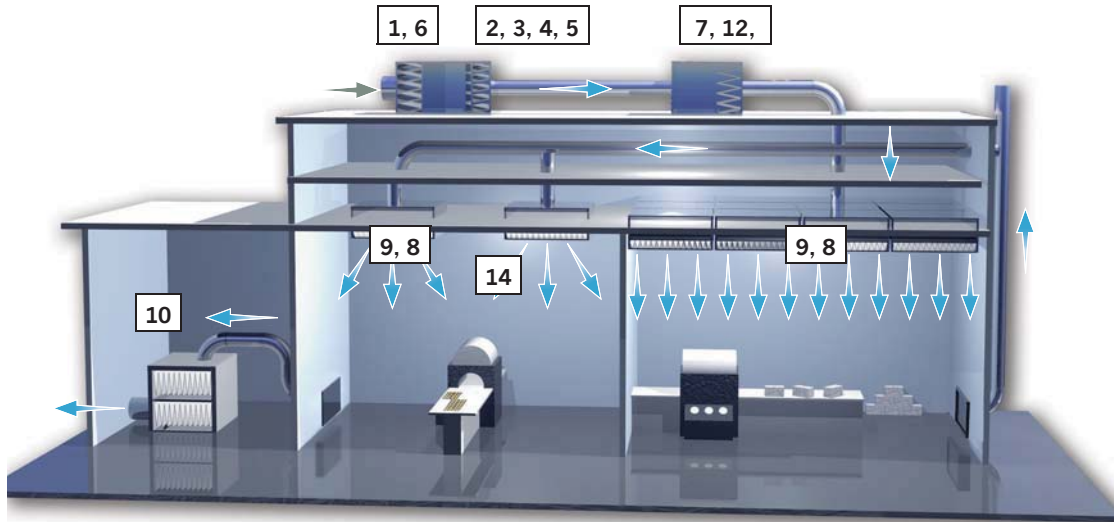
10. Absolute (XS)

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### Bio-Pharma Recommendations

With their enormous R&D budgets, pharmaceutical and biotechnology companies play an extremely important role in the future of health care. Filters continue to remain a critical part of the production of their products. Camfil is proud to be the leading worldwide supplier of 'clean air solutions' to the pharmaceutical and biotechnology industries. There are many different types of processes in pharmaceutical manufacturing, with different demands and concerns placed on the filtration systems. Selecting high efficiency filters and accessories ( housings, mounting frames, etc.) is not easy. One must consider many parameters, including filter efficiency, application, lifetime, running costs, equipment costs, accessibility, etc. The items on this page are Camfil's filter product recommendations for some common pharmaceutical areas.



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1. 30/30



2. Durafil



3. Hi-Flo



4. Riga-Flo



5. Camsorb Canisters



6. Glide/Pack



7. Magna/Pack



8. RFM22



9. Pharmaseal



10. Pharmaseal Exhaust



11. Pharmatain



12. Filtra 2000



13. Absolute (XS)



14. Termikfil

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## Commercial Building Recommendations (IAQ)

People spend 80% of their time indoors, whether at home, in an office building, a school, retail store, or other transient building. Some of us come in contact with many people in a day, all potential carriers of colds, the flu, or other infectious woe. We create dusts in our environment; paper dust, carpet fibers, and other nuisance dusts. We are subjected to various chemicals; from copy machines, laser printers, cleaning materials and ozone from virtually any item we can plug into an electrical outlet. Now, let's add the natural things; pollen and plant spores, pet dander, clothing wear, and even skin flakes from our fellow human beings. We are even subject to atmospheric impurities that are introduced through the HVAC system, through outside air intentionally introduced into a building. Your HVAC system air filters are the first line of defense to protect building occupants and maintain the pleasing appearance of your building. Camfil filters for commercial buildings can reduce the problems associated with all of these contaminants.



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1. 30/30



2. Durafil



3. Hi-Flo



4. Riga-Flo



5. Glide/Pack



6. Camsorb Canisters

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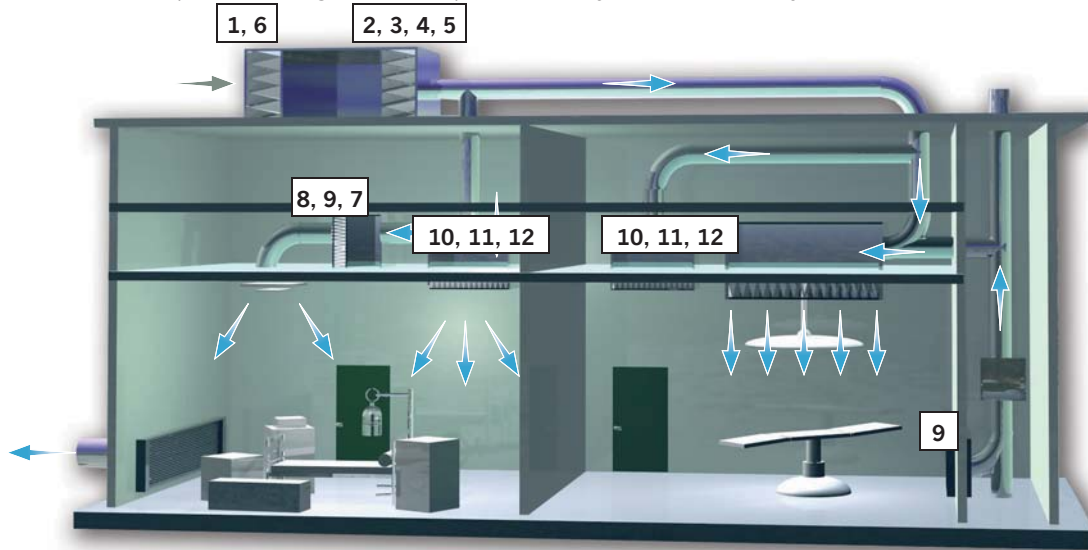
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### Medical Facility Recommendations

Infections contracted in hospitals are the fourth largest killer in North America. Every year in the United States, two million patients contract infections in hospitals. An estimated 103,000 die as a result. This equals as many deaths from AIDS, breast cancer, and auto accidents combined. Hospital infections add an estimated \$30.5 billion to the nation's hospital costs each year. It is estimated that one in six who enter a hospital acquire some type of malady they did not enter the facility with. Air filters are the primary defense for protecting patients, visitors, and staff in a medical facility. If we properly apply the environmental control guidelines, as published by cognizant authorities, we could reduce the aforementioned numbers significantly. Camfil filter housings, air filters, HEPA filters, ceiling modules, and carbon filters provide the highest level of protection for your medical facility.



The above recommendations are based upon existing criterion as published by cognizant authorities, or best practice, based upon published data. Where multiple products are listed that provide the same efficiency, they are listed in order of lowest life-cycle cost. For your specific application, contact Camfil or your local representative or distributor.



1. 30/30



2. Durafil



3. Hi-Flo



4. Riga-Flo



5. Aeropac



6. Glide/Pack



7. Magna/Pack



8. Filtra 2000



9. Absolute (XS)



10. Slimline RSR



11. Megalam DCM



12. Megalam Panels

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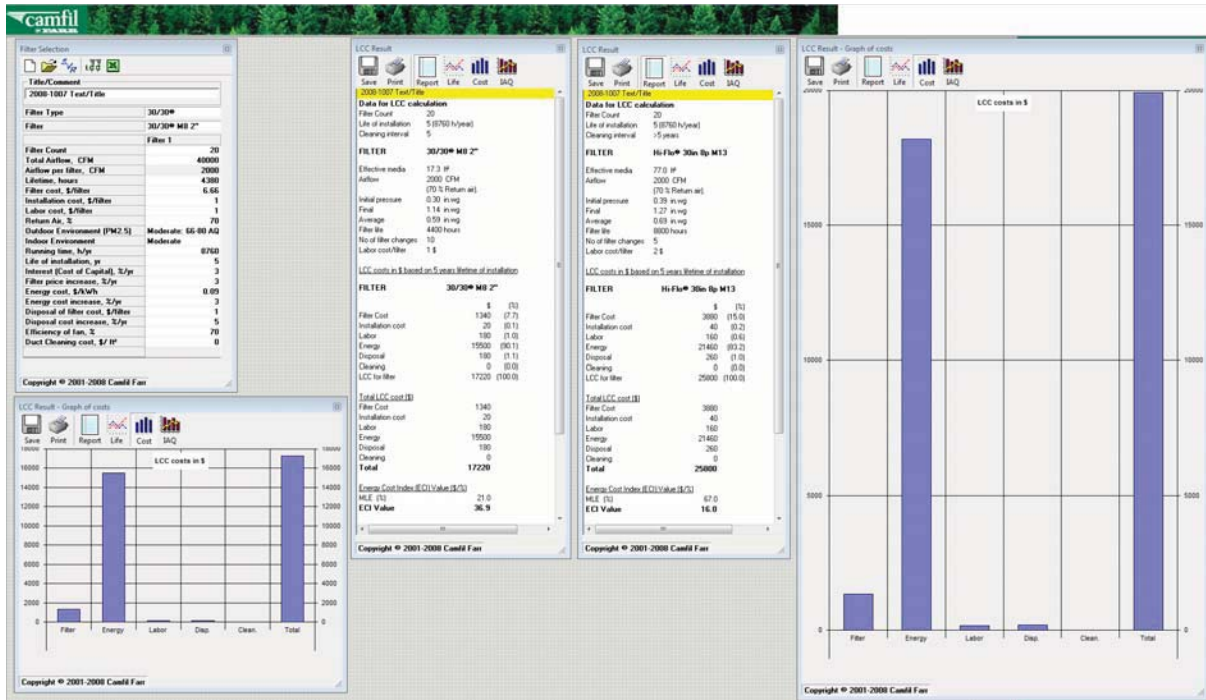


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## Life-Cycle Analysis

What is the true cost of air filters for your facility? Camfil Life-Cycle Cost Air Filtration Analysis (LCC) software can ensure that your facility is obtaining the best return on your investment. It examines factors such as energy cost, operating hours, filter prices, the quality and configuration of the filters, system maintenance and cleaning, and environmental data from recognized authorities.

It works with a product database of hundreds of air filters, both Camfil and competitive products. The data includes initial resistance to airflow, final resistance, and uses actual loading curve values, as opposed to straight-line data that may be presented by less sophisticated analytical methods.



Results are provided as numerical data and easy to read graphics. This includes all input parameters, energy usage, the number of filter change cycles, and total overall filter expenditures over selected periods of time. Users can also evaluate different scenarios, including changing filter efficiencies, adjusting hours of operation, or developing different methodologies that affect the cost of servicing the filters.

Users that have applied the recommendations have saved 40% or more on expenditures related to their HVAC systems. One can only imagine the savings overall when reduced liability is considered, based upon the proper selection of components that affect indoor air quality.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

## Air Filter Laboratory Testing

### Riverdale Test Facility

Camfil operates air filter testing laboratories in many of our R&D facilities around the world, all having a goal of developing technology for improved air quality for people, processes, and the environment. In North America, our Riverdale, NJ facility operates around the clock, testing filters per ASHRAE Standard 52.2 and European Standard EN779. This facility also performs burst tests and customer-specific or requested evaluations of our filters and our competitors. Reviewing hundreds of filters per year, this laboratory ensures that our products exceed published specifications and provide the improved air quality our customers desire.



*The Camfil Riverdale facility provides testing data for our customers and is used for research to support progression in the development of filter testing standards.*

### Additional Filter Testing Facilities Worldwide

Camfil operates a state-of-the-art carbon or gaseous contaminant analysis laboratory. Equipped with the latest technology, adsorber products are developed to meet our customers' needs as their demands for cleaner air reach ever-higher levels. From casinos to ultra high technology cleanrooms, Camfil has the gaseous removal products for any application.



*All of our facilities can test filters to any International standard and can also test a filter's capture ability on specific contaminants.*

### Scanning Electron Microscope (SEM)

In our quest to manufacture ultimate levels of air filtration, one of the tools we use is a scanning electron microscope (SEM). This is a type of electron microscope that images the sample surface by scanning it with a high-energy beam of electrons in a raster scan pattern. The electrons interact with the atoms that make up the sample, producing signals that contain information about the sample's surface topography, composition, and other properties, such as electrical conductivity.

In its primary detection mode, secondary electron imaging, the SEM can produce very high-resolution images of a sample surface, revealing details about 1 to 5 nanometer in size. Camfil can then study these particles in a three-dimensional form useful for understanding the surface structure of a sample. The information obtained can then be used to ensure proper filter selection or provide information for the development of new filter media or air filters.



*All of the photos of sub-micron particles used in this catalog were taken with Camfil's SEM in Trosa, Sweden.*

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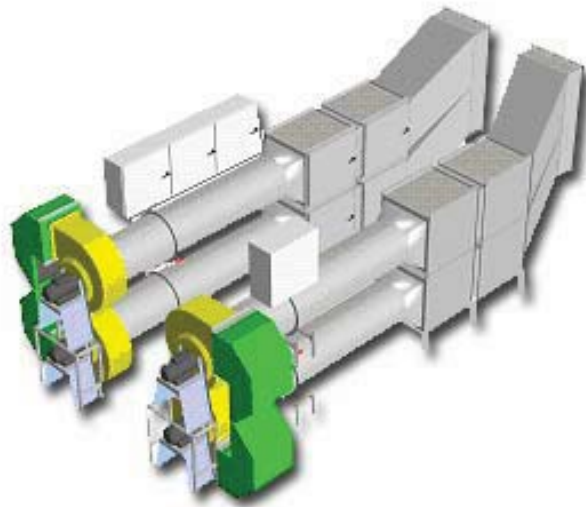
Camfield Lab

Camfil takes the filter testing laboratory to the customer with a unique “mobile” approach to testing air filters in real-life operating conditions. Called the Camfield Lab, this new test rig makes it possible to determine the most effective filtration solution based upon the geographic location of a building and its specific environmental air quality circumstance. One of our two roving modules is shown in the photo below.



The Camfield Lab consists of four parallel ducts that may be fitted with prefilters and final filters, allowing four different filter combinations to be tested at the same time. The test rig, installed on a flatbed, can be transported to any desired location and parked in the test area. Using actual environmental conditions, filter performance may be evaluated using various air filter types and efficiencies.

Camfield Lab could be used to: (a) analyze the ambient air quality; (b) determine whether the building is currently equipped with adequate filtration to handle these contaminants; and (c) further determine the best type and level of filtration for the building by simultaneously testing several filter combinations. It thereby combines the controlled environment of a laboratory with a more meaningful real world setting, offering the “best of both worlds” from a testing standpoint. Although the test rig will be used mainly at outdoor locations (due to its size), it could be placed indoors at a large facility, such as a stadium or convention center.



Each Camfield Lab includes four independent testing ducts, two on each side of the unit.

For example, placed in the immediate vicinity of an important facility (such as a government building, a hospital, etc.), the

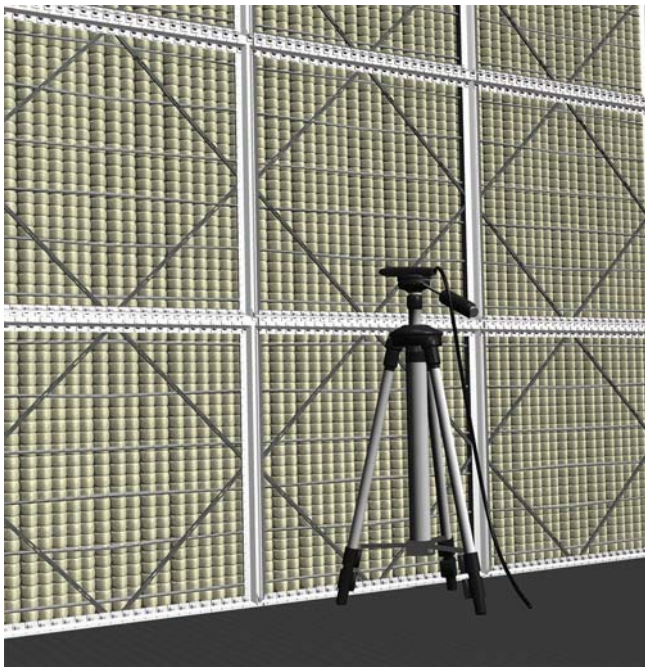


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In-situ Testing



Today's air filtration marketplace includes products, offered in many configurations, that present various advantages and disadvantages when compared to other air filter offerings. There are also different types of media incorporating varying principles of particle capture, each with its own advantage when applied in a heating and air conditioning application.

How can filter users differentiate manufacturers' claims and make intelligent decisions as to what products are applicable to meet their needs? Historically, many depended upon test reports. Unfortunately, today's testing laboratory methodologies may not give a true barometer of a filter's performance over time, as these filters are not tested under real life conditions.

Camfil Farr addresses these concerns by performing actual on-site (in-situ) filter performance evaluations using industry defined procedures. With the user designated participants, information is obtained using an optical particle counter which measures the number of particles in multiple bands, including sub-micron; defined as repairable and critical to human health.

Camfil then provides a final report which includes a particle size versus efficiency analysis detailing all of the tested filters abilities to capture large particles and sub-micron size particles, that may affect health or processes. Pressure drop data, relative to a filter's actual life within a system, and its overall effect on system airflow and use of energy is also detailed.

Users can evaluate the use of increased media area compared to standard media area offerings. They can evaluate filters of similar construction that use different types of media. And most importantly, they can evaluate Camfil products against other manufacturers offerings.

The process includes a facility survey to establish the integrity of the filter holding mechanisms, the overall HVAC worthiness of the system, and an analysis of past usage data to develop a baseline of comparison. Actual in-place testing begins with an initial filter efficiency test and continues on a periodic schedule (time-dependent upon the type of filters being evaluated).

The final data is often used to demonstrate performance to the facility's required standard of care for air quality and to prove that their filter expenditure has the lowest life-cycle cost.

Camfil also maintains a database of historical analyses from other facilities that may assist others in their selection of filters for their similar applications.

Contact your authorized Camfil representative or distributor for details on Camfil's In-Situ Filter Evaluation Program.



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## Camfil Mobile Media Tester

Filters may use microfine media fibers, coarse media fibers, synthetics, or polyesters — which will work in your application? Which will provide the efficiency required to ensure that you are protecting the health of your building’s occupants or ensure that your process is as clean as it needs to be?

Camfil now offers our Mobile Media Tester to answer your filter performance questions and demonstrate that you are obtaining the particle removal efficiency you are paying for.

This portable testing system can evaluate any high-efficiency, flat-sheet filter media, including samples obtained directly from your filter stock, existing air handlers, or samples that you request from your filter distributor. Contact your Camfil distributor for a media evaluation at your facility today.

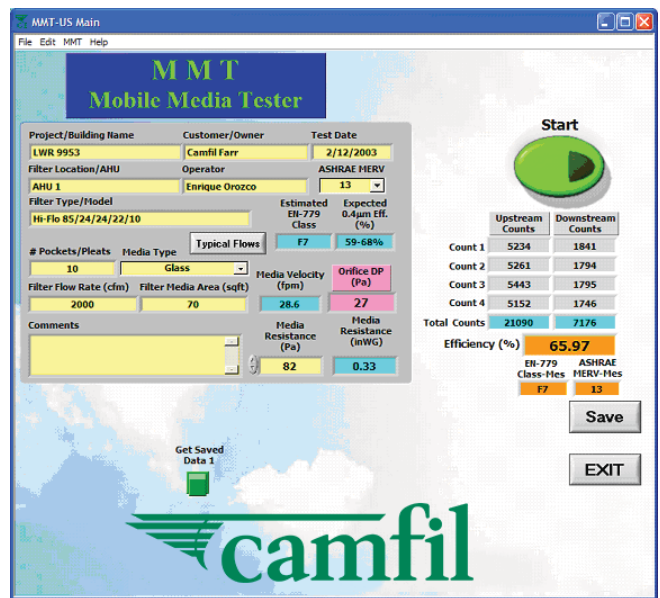


## Camfil CamTester

Air quality should always be the number one criterion for the selection of air filters. But, with today’s sky-rocketing energy costs, with no downturn in sight, the energy used by a filter must be part of the filter selection equation. Media area, configuration, and the type of media all play a part in the energy that a filter will use over its life in the system. How can a user wade through all of the printed materials available or evaluate products that may not have the detailed information specific to the product they want to use?

Your Camfil representative can address these concerns with the Camfil Cam-Tester. Users can evaluate any air filter for pressure drop, at any airflow they desire, to establish which filters will use more energy. Filters may be clean out-of-the-box, or they may be removed from a system and tested through their usage period. Up to 70% of the cost of moving air through an HVAC can be used by the air filters. Judicious filter selection here can provide high dollar energy savings with little, or no physical changes to the system.

Contact your local Camfil representative for a Cam-Tester evaluation today.



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## Market Segments

Camfil defines our products based upon the specific markets that they serve. For your convenience, our catalog has tabs, and our product sheets are color-coded for quick access. The market definitions are as follows:

### Comfort Air - protecting people

Camfil ventilation filters prevent airborne particles from reducing airflow volumes in HVAC systems. During their lifetime, these filters keep air-handling systems clean so they can perform in accordance with design parameters. These same filters also help safeguard the well-being and health of people. Camfil's comfort air filters are commonly used in office buildings, schools, hospitals, conference centers, shopping malls, and airports.

### Clean Processes - protecting processes

A few unfiltered particles can have serious consequences in certain applications. In fact, certain semiconductor and pharmaceutical processes would be impossible without ultra-clean air. Different processes require different degrees of air purification, so an important part of Camfil's business concept is to help customers analyze and specify their requirements. We offer a wide range of filter solutions to satisfy all your needs.

### Safety & Protection - protecting the environment

Exhaust air from many industrial processes is unhealthy. Examples include emissions from nuclear power plants, laboratories, and chemical plants. Harmful exhaust air needs to be filtered before it is released to the atmosphere. Camfil has filters that adsorb and collect odorous or harmful substances that can pollute the outdoor air. To protect employees, processes and the environment, plant managers must control the indoor air quality surrounding a wide range of manufacturing processes. Camfil uses patented technology within a range of air pollution control systems that remove process-related airborne contaminants in an efficient, cost-effective manner.

On each product page there is a reference to a product sheet. These product sheets have more detail and are available from Camfil, your local representative, or by download from one of our web sites.



Summary Prefilters MERV 4-13



**Pleated Panel Filters**  
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Aeropleat® IV  
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**Pleated Panel Filters**  
AP-Thirteen  
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**Metal Filters**  
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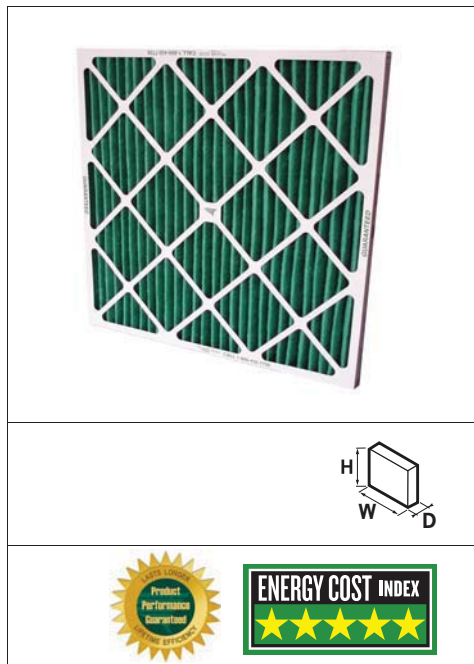


**Metal Filters**  
ECO® Moisture Separator  
**Page 52**

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# 30/30®



## Advantages

- Guaranteed to last longer
- True MERV 8 maintained efficiency
- Meets all published hospital filter efficiency guidelines

**Description:** High capacity pleated panel filter available in 1", 2" or 4" depths.

**Typical applications:** Prefilters to higher efficiency filters, stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** Value of 8 for MERV and MERV-A when evaluated under ASHRAE Testing Standard 52.2.

**Media:** Proprietary blend of cotton and synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of five stars, listed as UL 900.

See Literature 1002 for more details.

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per Linear Foot
054862-001	20 x 16 x 1	19.50	15.50	0.88	780	5.4	0.23	16
054862-002	20 x 20 x 1	19.50	19.50	0.88	970	6.6	0.23	16
054862-003	25 x 20 x 1	24.50	19.50	0.88	1215	8.3	0.23	16
054862-004	25 x 16 x 1	24.50	15.50	0.88	970	6.7	0.23	16
054862-005	24 x 24 x 1	23.50	23.50	0.88	1400	9.8	0.23	16
054862-006	20 x 14 x 1	19.50	13.50	0.88	680	4.6	0.23	16
054862-007	25 x 14 x 1	24.50	13.50	0.88	850	5.7	0.23	16
054862-008	20 x 15 x 1	19.50	14.50	0.88	730	5.1	0.23	16
054862-009	20 x 7 x 1	19.50	6.50	0.88	340	2.4	0.23	16
054862-010	24 x 12 x 1	23.50	11.50	0.88	700	4.9	0.23	16
054862-011	24 x 20 x 1	23.50	19.50	0.88	1170	8.0	0.23	16
054862-012	16 x 16 x 1	15.50	15.50	0.88	620	4.3	0.23	16
054862-013	25 x 15 x 1	24.50	14.50	0.88	910	6.4	0.23	16
054862-014	25 x 25 x 1	24.50	24.50	0.88	1520	10.5	0.23	16
054862-015	24 x 16 x 1	23.50	15.50	0.88	930	6.5	0.23	16
054862-016	20 x 10 x 1	19.50	9.50	0.88	490	3.3	0.23	16
054862-017	25 x 18 x 1	24.50	17.50	0.88	1100	7.6	0.23	16
054862-019	20 x 12 x 1	19.50	11.50	0.88	580	4.1	0.23	16
054862-020	20 x 18 x 1	19.50	17.50	0.88	880	6.1	0.23	16
054862-021	22 x 22 x 1	21.50	21.50	0.88	1180	8.2	0.23	16
054862-022	24 x 10 x 1	23.50	9.50	0.88	580	4.0	0.23	16



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# Prefilters MERV 4-13

## Pleated Panel Filters

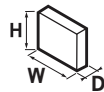
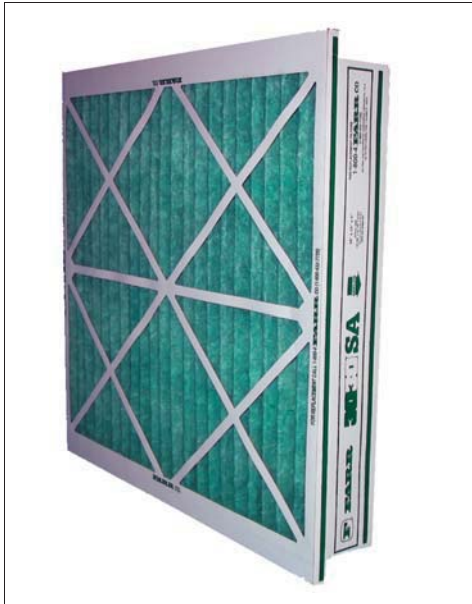
Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per Linear Foot
054862-023	25 x 10 x 1	24.50	9.50	0.88	610	4.1	0.23	16
054862-024	25 x 12 x 1	24.50	11.50	0.88	730	5.2	0.23	16
054862-025	12 x 12 x 1	11.50	11.50	0.88	350	2.5	0.23	16
054862-028	24 x 18 x 1	23.50	17.50	0.88	1050	7.3	0.23	16
049880-001	20 x 16 x 2	19.50	15.50	1.75	1110	9.9	0.31	15
049880-002	20 x 20 x 2	19.50	19.50	1.75	1390	11.9	0.31	15
049880-003	25 x 20 x 2	24.50	19.50	1.75	1740	14.9	0.31	15
049880-004	25 x 16 x 2	24.50	15.50	1.75	1390	12.4	0.31	15
049880-005	24 x 24 x 2	23.38	23.38	1.75	2000	17.3	0.31	15
049880-006	24 x 12 x 2	23.38	11.38	1.75	1000	8.4	0.31	15
049880-007	20 x 12 x 2	19.50	11.88	1.75	835	7.4	0.31	15
049880-008	20 x 10 x 2	19.50	9.50	1.75	700	6.0	0.31	15
049880-009	20 x 14 x 2	19.50	13.50	1.75	975	8.3	0.31	15
049880-010	25 x 14 x 2	24.50	23.50	1.75	1220	10.4	0.31	15
049880-011	20 x 15 x 2	19.50	19.50	1.75	1045	9.3	0.31	15
049880-012	24 x 20 x 2	23.50	19.50	1.75	1670	14.3	0.31	15
049880-013	20 x 18 x 2	19.50	17.50	1.75	1250	10.8	0.31	15
049880-014	25 x 18 x 2	24.50	17.50	1.75	1565	13.5	0.31	15
049880-015	24 x 18 x 2	23.50	17.50	1.75	1500	13.0	0.31	15
049880-016	24 x 16 x 2	23.50	15.50	1.75	1335	11.8	0.31	15
049880-018	25 x 25 x 2	24.50	24.50	1.75	2170	19.0	0.31	15
049880-019	16 x 16 x 2	15.50	15.50	1.75	890	7.8	0.31	15
049880-020	25 x 15 x 2	24.50	15.50	1.75	1300	11.6	0.31	15
059413-001	24 x 24 x 4	23.38	23.38	3.75	2000	27.7	0.27	11
059413-002	24 x 12 x 4	23.38	11.38	3.75	1000	13.9	0.27	11
059413-003	20 x 20 x 4	19.38	19.38	3.75	1390	18.9	0.27	11
059413-004	20 x 16 x 4	19.38	15.38	3.75	1110	15.7	0.27	11
059413-005	25 x 16 x 4	24.38	15.38	3.75	1390	19.7	0.27	11
059413-006	25 x 20 x 4	24.38	19.38	3.75	1740	23.6	0.27	11
059413-007	25 x 29 x 4	24.38	28.38	3.75	2520	35.4	0.27	11
059413-008	24 x 20 x 4	23.38	19.38	3.75	1670	22.7	0.27	11
059413-009	24 x 18 x 4	23.38	17.38	3.75	1500	20.2	0.27	11
059413-010	25 x 25 x 4	24.38	24.38	3.75	2170	30.1	0.27	11
059413-011	24 x 16 x 4	23.38	15.38	3.75	1330	18.7	0.27	11

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# 30/30<sup>®</sup> SA



## Advantages

- Guaranteed to last longer
- Includes 1" nominal header for 4" deep filter application in a side access housing with 1" track
- Guaranteed to maintain efficiency
- Lasts longer than deep cubes or polyester pocket filters

**Description:** High capacity 4" deep pleated panel filter with integral header for track installations.

**Typical applications:** Prefilters to higher efficiency filters, stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** Value of 8 for MERV and MERV-A when evaluated under ASHRAE Testing Standard 52.2.

**Media:** Proprietary blend of cotton and synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of five stars, UL Class 2.

See Literature 1003SA for more details.

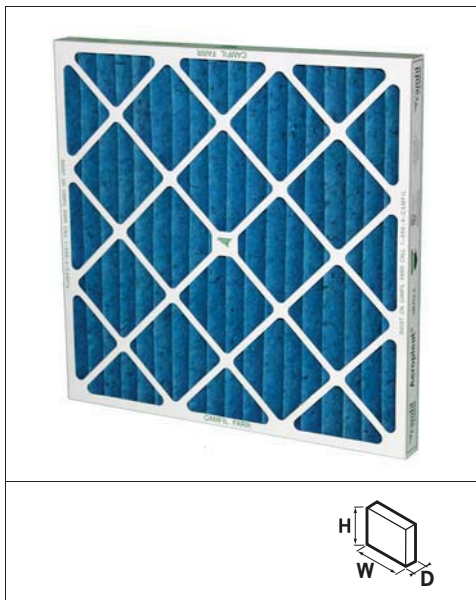
Part Number	Nominal Size (inches)	Actual Size (inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
074987-001	24 x 24V x 4	23.38 x 23.38 x 3.88	2000	0.27	25.2
074987-002	24 x 20V x 4	23.38 x 19.38 x 3.88	1670	0.27	20.7
074987-003	24 x 12V x 4	23.38 x 11.38 x 3.88	1000	0.27	12.6
074987-004	12 x 24H x 4	11.38 x 23.38 x 3.88	1000	0.27	11.3
074987-005	20 x 24H x 4	19.38 x 23.38 x 3.88	1670	0.27	20.1

In nominal size column, V indicates headers on vertical sides only, H indicates headers on horizontal sides only.



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# Aeropleat® III



## Advantages

- Low maintained pressure drop for longer filter life
- High wet-strength beverage board frame creates a rigid and durable enclosure
- Welded wire media backing to maintain radial pleat configuration
- Available in 1", 2" and 4" depths
- Excellent choice for those who change filters based upon time or PM program

**Description:** Medium capacity pleated panel filter.

**Typical applications:** Prefilters to higher efficiency filters, stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** MERV 8 and MERV-A 8 sustained efficiency when evaluated under ASHRAE Testing Standard 52.2.

**Media:** Proprietary blend of cotton and synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of three stars, UL 900.

See Literature 1008 for more details.

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per Linear Foot
119303-001	20 x 16 x 1	19.50	15.50	0.88	780	4.0	0.22	12
119303-002	20 x 20 x 1	19.50	19.50	0.88	970	4.8	0.22	12
119303-003	25 x 20 x 1	24.50	19.50	0.88	1215	6.0	0.22	12
119303-004	25 x 16 x 1	24.50	15.50	0.88	970	5.0	0.22	12
119303-005	24 x 24 x 1	23.50	23.50	0.88	1400	7.1	0.22	12
119303-006	20 x 14 x 1	19.50	13.50	0.88	680	3.5	0.22	12
119303-007	24 x 20 x 1	23.50	19.50	0.88	1170	5.8	0.22	12
119303-008	20 x 15 x 1	19.50	14.50	0.88	730	3.7	0.22	12
119303-009	24 x 12 x 1	23.50	11.50	0.88	700	3.5	0.22	12
119303-010	24 x 16 x 1	23.50	15.50	0.88	930	4.8	0.22	12
119303-011	25 x 14 x 1	24.50	13.50	0.88	850	4.3	0.22	12
119303-012	20 x 10 x 1	19.50	9.50	0.88	490	2.5	0.22	12
119303-013	25 x 25 x 1	24.50	24.50	0.88	1520	7.4	0.22	12
119303-014	25 x 18 x 1	24.50	17.50	0.88	1100	5.7	0.22	12
119303-016	16 x 16 x 1	15.50	15.50	0.88	620	3.2	0.22	12
119303-017	20 x 7 x 1	19.50	6.50	0.88	340	1.9	0.22	12
119303-018	20 x 12 x 1	19.50	11.50	0.88	580	2.9	0.22	12
119303-019	20 x 18 x 1	19.50	17.50	0.88	880	4.5	0.22	12
119303-020	22 x 22 x 1	21.50	21.50	0.88	1180	6.2	0.22	12

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Pleated Panel Filters

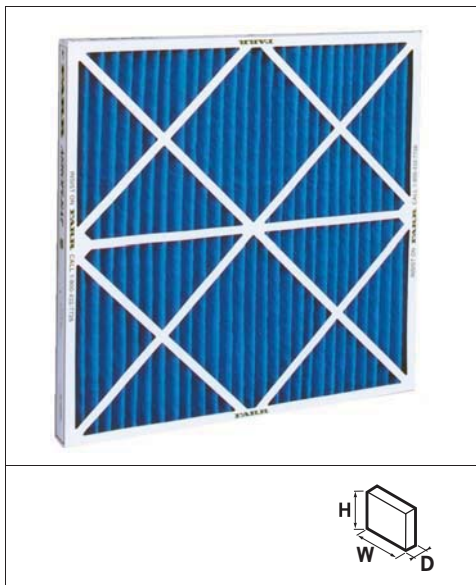
Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance (inches w.g.)	Pleats per Linear Foot
119303-021	24 x 10 x 1	23.50	9.50	0.88	580	3.0	0.22	12
119303-022	25 x 10 x 1	24.50	9.50	0.88	610	3.1	0.22	12
119303-023	25 x 12 x 1	24.50	11.50	0.88	730	3.6	0.22	12
119303-024	25 x 15 x 1	24.50	14.50	0.88	910	4.7	0.22	12
119303-026	24 x 14 x 1	23.50	13.50	0.88	820	4.1	0.22	12
119303-027	16 x 12 x 1	15.50	15.50	0.88	470	2.3	0.22	12
119303-028	24 x 18 x 1	23.50	17.50	0.88	1050	5.5	0.22	12
403243-001	10 x 10 x 1	9.50	9.50	0.88	240	1.4	0.22	12
403243-002	12 x 12 x 1	11.50	11.50	0.88	350	1.7	0.22	12
116300-001	20 x 16 x 2	19.50	15.50	1.75	1110	6.5	0.23	10
116300-002	20 x 20 x 2	19.50	19.50	1.75	1390	8.0	0.23	10
116300-003	25 x 20 x 2	24.50	19.50	1.75	1740	10.0	0.23	10
116300-004	25 x 16 x 2	24.50	15.50	1.75	1390	8.8	0.23	10
116300-005	24 x 24 x 2	23.50	23.50	1.75	2000	11.4	0.23	10
116300-006	24 x 12 x 2	23.50	23.50	1.75	1000	5.5	0.23	10
116300-007	24 x 20 x 2	23.50	23.50	1.75	1670	10.3	0.23	10
116300-008	24 x 18 x 2	23.50	23.50	1.75	1500	9.1	0.23	10
116300-009	25 x 18 x 2	24.50	24.50	1.75	1565	9.5	0.23	10
116300-010	20 x 14 x 2	19.50	19.50	1.75	975	6.1	0.23	10
116300-011	25 x 14 x 2	24.50	24.50	1.75	1220	6.9	0.23	10
116300-012	24 x 16 x 2	23.50	23.50	1.75	1335	7.8	0.23	10
116300-013	25 x 25 x 2	24.50	24.50	1.75	2170	13.3	0.23	10
116300-014	20 x 15 x 2	19.50	19.50	1.75	1045	6.1	0.23	10
116300-015	20 x 10 x 2	19.50	19.50	1.75	700	4.6	0.23	10
116300-016	16 x 16 x 2	15.50	15.50	1.75	890	5.2	0.23	10
116300-017	20 x 12 x 2	19.50	19.50	1.75	835	5.1	0.23	10
116300-018	20 x 18 x 2	19.50	19.50	1.75	1250	7.6	0.23	10
116300-019	25 x 15 x 2	24.50	15.50	1.75	1300	7.6	0.23	10
116307-001	24 x 24 x 4	23.38	23.38	3.75	2000	20.0	0.21	9
116307-002	24 x 12 x 4	23.38	11.38	3.75	1000	10.1	0.21	9
116307-003	20 x 20 x 4	19.38	19.38	3.75	1390	14.6	0.21	9
116307-004	20 x 16 x 4	19.38	15.38	3.75	1110	11.5	0.21	9
116307-005	25 x 16 x 4	24.38	15.38	3.75	1390	14.3	0.21	9
116307-006	25 x 20 x 4	24.38	19.38	3.75	1740	18.3	0.21	9
116307-007	24 x 20 x 4	23.38	19.38	3.75	1670	16.4	0.21	9
116307-009	24 x 18 x 4	23.38	15.38	3.75	1500	15.1	0.21	9
116307-012	24 x 16 x 4	23.38	15.38	3.75	1330	13.7	0.21	9

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# Aeropleat® IV



## Advantages

- High wet-strength beverage board frame creates a rigid and durable enclosure
- Welded wire media backing to maintain radial pleat configuration
- High capacity for longer life than standard pleated filters
- Available in 1", 2" and 4" depths
- Low maintained resistance to airflow for longer filter life

**Description:** High capacity pleated panel filter.

**Typical applications:** Prefilters to higher efficiency filters, stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** MERV 8 and MERV-A 8 sustained efficiency when evaluated under ASHRAE Testing Standard 52.2.

**Media:** Proprietary blend of cotton and synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of four stars, UL 900.

See Literature 1012 for more details.

Part Number	Nominal Size HxWxD (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance@Capacity (inches w.g.)	Pleats per LinearFoot
400012-001	20 x 16 x 1	19.50	15.50	0.88	780	5.4	0.18	16
400012-002	20 x 20 x 1	19.50	19.50	0.88	970	6.6	0.18	16
400012-003	25 x 20 x 1	24.50	19.50	0.88	1215	8.3	0.18	16
400012-004	25 x 16 x 1	24.50	15.50	0.88	970	6.7	0.18	16
400012-005	24 x 24 x 1	23.50	23.50	0.88	1400	9.8	0.18	16
400012-006	20 x 14 x 1	19.50	13.50	0.88	680	4.6	0.18	16
400012-007	24 x 20 x 1	23.50	19.50	0.88	1170	8.0	0.18	16
400012-008	20 x 15 x 1	19.50	14.50	0.88	730	5.1	0.18	16
400012-009	24 x 12 x 1	23.50	11.50	0.88	700	4.9	0.18	16
400012-010	24 x 16 x 1	23.50	15.50	0.88	930	6.5	0.18	16
400012-011	25 x 14 x 1	24.50	13.50	0.88	850	5.7	0.18	16
400012-012	20 x 10 x 1	19.50	9.50	0.88	490	3.3	0.23	16
400012-013	25 x 25 x 1	24.50	24.50	0.88	1520	10.5	0.23	16
400012-014	25 x 18 x 1	24.50	17.50	0.88	1100	7.6	0.23	16
400012-016	16 x 16 x 1	15.50	15.50	0.88	620	4.3	0.18	16
400012-017	20 x 7 x 1	19.50	6.50	0.88	340	2.4	0.18	16
400012-018	20 x 12 x 1	19.50	11.50	0.88	580	4.1	0.18	16
400012-019	20 x 18 x 1	19.50	17.50	0.88	880	6.1	0.18	16
400012-020	22 x 22 x 1	21.50	21.50	0.88	1180	8.2	0.23	16
400012-021	24 x 10 x 1	23.50	9.50	0.88	580	4.0	0.23	16

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Pleated Panel Filters

Part Number	Nominal Size HxWxD (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance@Capacity (inches w.g.)	Pleats per LinearFoot
400012-022	25 x 10 x 1	24.50	9.50	0.88	610	4.1	0.23	16
400012-023	25 x 12 x 1	24.50	11.50	0.88	730	5.2	0.18	16
400012-024	25 x 15 x 1	24.50	14.50	0.88	910	6.4	0.18	16
400012-027	16 x 12 x 1	15.50	11.50	0.88	470	3.3	0.18	16
400012-028	24 x 18 x 1	23.50	17.50	0.88	1050	7.3	0.18	16
403244-001	10 x 10 x 1	9.5	9.5	0.88	240	1.6	0.18	16
403244-002	12 x 12 x 1	11.50	11.50	0.88	350	2.5	0.18	16
400010-001	20 x 16 x 2	19.50	15.50	1.75	1110	9.9	0.25	15
400010-002	20 x 20 x 2	19.50	19.50	1.75	1390	11.9	0.25	15
400010-003	25 x 20 x 2	24.50	19.50	1.75	1740	14.9	0.25	15
400010-004	25 x 16 x 2	24.50	15.50	1.75	1390	12.4	0.25	15
400010-005	24 x 24 x 2	23.50	23.50	1.75	2000	17.3	0.25	15
400010-006	24 x 12 x 2	23.50	23.50	1.75	1000	8.4	0.25	15
400010-007	24 x 20 x 2	23.50	23.50	1.75	1670	14.3	0.25	15
400010-008	24 x 18 x 2	23.50	23.50	1.75	1500	13.0	0.25	15
400010-009	25 x 18 x 2	24.50	24.50	1.75	1565	13.5	0.25	15
400010-010	20 x 14 x 2	19.50	19.50	1.75	975	8.3	0.25	15
400010-011	25 x 14 x 2	24.50	24.50	1.75	1220	10.4	0.25	15
400010-012	24 x 16 x 2	23.50	23.50	1.75	1335	11.8	0.25	15
400010-013	25 x 25 x 2	24.50	24.50	1.75	2170	19.0	0.25	15
400010-014	20 x 15 x 2	19.50	19.50	1.75	1045	9.3	0.25	15
400010-015	20 x 10 x 2	19.50	19.50	1.75	700	6.0	0.25	15
400010-016	16 x 16 x 2	15.50	15.50	1.75	890	7.8	0.25	15
400010-017	20 x 12 x 2	19.50	19.50	1.75	835	7.4	0.25	15
400010-018	20 x 18 x 2	19.50	19.50	1.75	1250	10.8	0.25	15
400010-019	25 x 15 x 2	24.50	15.50	1.75	1300	11.6	0.25	15
400013-001	24 x 24 x 4	23.38	23.38	3.75	2000	27.7	0.23	11
400013-002	24 x 12 x 4	23.38	11.38	3.75	1000	13.9	0.23	11
400013-003	20 x 20 x 4	19.38	19.38	3.75	1390	18.9	0.23	11
400013-004	20 x 16 x 4	19.38	15.38	3.75	1110	15.7	0.23	11
400013-005	25 x 16 x 4	24.38	15.38	3.75	1390	19.7	0.23	11
400013-006	25 x 20 x 4	24.38	19.38	3.75	1740	23.6	0.23	11
400013-007	24 x 20 x 4	23.38	19.38	3.75	1670	22.7	0.23	11
400013-009	24 x 18 x 4	23.38	17.38	3.75	1500	20.2	0.23	11
400013-012	24 x 16 x 4	23.38	15.38	3.75	1330	18.7	0.23	11

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# AP-Eleven



## Advantages

- Lowest cost of ownership for a MERV 11 filter in a pleated filter design
- Radial pleats with welded wire backing for higher dust holding capacity and longer life
- Biodegradable Kraft board frame creates a rigid and durable enclosure, manufactured under Sustainable Forestry Initiative (SFI)
- Available in 1", 2" and 4" depths

**Description:** High efficiency synthetic pleated media, welded wire media support and Kraft board enclosing frame manufactured under the Sustainable Forestry Initiative.

**Typical applications:** Stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** MERV 11 per ASHRAE Standard 52.2.

**Media:** Synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** UL Class 2.

See Literature 1035 for more details.

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per LinearFoot
404433-001	20 x 16 x 1	19.50	15.50	0.88	780	5.4	0.18	16
404433-002	20 x 20 x 1	19.50	19.50	0.88	970	6.6	0.18	16
404433-003	25 x 20 x 1	24.50	19.50	0.88	1215	8.3	0.18	16
404433-004	25 x 16 x 1	24.50	15.50	0.88	970	6.7	0.18	16
404433-005	24 x 24 x 1	23.50	23.50	0.88	1400	9.8	0.18	16
404433-006	20 x 14 x 1	19.50	13.50	0.88	680	4.6	0.18	16
404433-007	24 x 20 x 1	23.50	19.50	0.88	1170	8.0	0.18	16
404433-008	20 x 15 x 1	19.50	14.50	0.88	730	5.1	0.18	16
404433-009	24 x 12 x 1	23.50	11.50	0.88	700	4.9	0.18	16
404433-010	24 x 16 x 1	23.50	15.50	0.88	930	6.5	0.18	16
404433-011	25 x 14 x 1	24.50	13.50	0.88	850	5.7	0.18	16
404433-012	20 x 10 x 1	19.50	9.50	0.88	490	3.3	0.18	16
404433-013	25 x 25 x 1	24.50	24.50	0.88	1520	10.5	0.18	16
404433-014	25 x 18 x 1	24.50	17.50	0.88	1100	7.6	0.18	16
404433-016	16 x 16 x 1	15.50	15.50	0.88	620	4.3	0.18	16
404433-017	20 x 7 x 1	19.50	6.50	0.88	340	2.4	0.18	16
404433-018	20 x 12 x 1	19.50	11.50	0.88	580	4.1	0.18	16
404433-019	20 x 18 x 1	19.50	17.50	0.88	880	6.1	0.18	16
404433-020	22 x 22 x 1	21.50	21.50	0.88	1180	8.2	0.18	16
404433-021	24 x 10 x 1	23.50	9.50	0.88	580	4.0	0.18	16

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.



Pleated Panel Filters

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per LinearFoot
404433-022	25 x 10 x 1	24.50	9.50	0.88	610	4.1	0.18	16
404433-023	25 x 12 x 1	24.50	11.50	0.88	730	5.2	0.18	16
404433-024	25 x 15 x 1	24.50	14.50	0.88	910	6.4	0.18	16
404433-026	24 x 14 x 1	23.50	15.50	0.88	820	5.5	0.18	16
404433-027	16 x 12 x 1	15.50	11.50	0.88	470	3.3	0.18	16
404433-028	24 x 18 x 1	23.50	17.50	0.88	1050	7.3	0.18	16
404434-001	20 x 16 x 2	19.50	15.50	1.75	1110	9.9	0.25	15
404434-002	20 x 20 x 2	19.50	19.50	1.75	1390	11.9	0.25	15
404434-003	25 x 20 x 2	24.50	19.50	1.75	1740	14.9	0.25	15
404434-004	25 x 16 x 2	24.50	15.50	1.75	1390	12.4	0.25	15
404434-005	24 x 24 x 2	23.50	23.50	1.75	2000	17.3	0.25	15
404434-006	24 x 12 x 2	23.50	23.50	1.75	1000	8.4	0.25	15
404434-007	24 x 20 x 2	23.50	23.50	1.75	1670	14.3	0.25	15
404434-008	24 x 18 x 2	23.50	23.50	1.75	1500	13.0	0.25	15
404434-009	25 x 18 x 2	24.50	24.50	1.75	1565	13.5	0.25	15
404434-010	20 x 14 x 2	19.50	19.50	1.75	975	8.3	0.25	15
404434-011	25 x 14 x 2	24.50	24.50	1.75	1220	10.4	0.25	15
404434-012	24 x 16 x 2	23.50	23.50	1.75	1335	11.8	0.25	15
404434-013	25 x 25 x 2	24.50	24.50	1.75	2170	19.0	0.25	15
404434-014	20 x 15 x 2	19.50	19.50	1.75	1045	9.3	0.25	15
404434-015	20 x 10 x 2	19.50	19.50	1.75	700	6.0	0.25	15
404434-016	16 x 16 x 2	15.50	15.50	1.75	890	7.8	0.25	15
404434-017	20 x 12 x 2	19.50	19.50	1.75	835	7.4	0.25	15
404434-018	20 x 18 x 2	19.50	19.50	1.75	1250	10.8	0.25	15
404434-019	25 x 15 x 2	24.50	15.50	1.75	1300	11.6	0.25	15
404435-001	24 x 24 x 4	23.38	23.38	3.75	2000	27.7	0.23	11
404435-002	24 x 12 x 4	23.38	11.38	3.75	1000	13.9	0.23	11
404435-003	20 x 20 x 4	19.38	19.38	3.75	1390	18.9	0.23	11
404435-004	20 x 16 x 4	19.38	15.38	3.75	1110	15.7	0.23	11
404435-005	25 x 16 x 4	24.38	15.38	3.75	1390	19.7	0.23	11
404435-006	25 x 20 x 4	24.38	19.38	3.75	1740	23.6	0.23	11
404435-007	24 x 20 x 4	23.38	19.38	3.75	1670	22.7	0.23	11
404435-009	24 x 18 x 4	23.38	17.38	3.75	1500	20.2	0.23	11
404435-012	24 x 16 x 4	23.38	15.38	3.75	1330	18.7	0.23	11

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# AP-Thirteen



## Advantages

- **MERV 13 performance in a 2" or 4" depth to meet LEED requirements**
- **Radial pleats with welded wire backing for higher dust holding capacity and longer life**
- **Biodegradable Kraft board frame creates a rigid and durable enclosure, manufactured under Sustainable Forestry Initiative (SFI)**

**Description:** High efficiency synthetic pleated media, welded wire media support and Kraft board enclosing frame manufactured under the Sustainable Forestry Initiative.

**Typical applications:** Stand-alone filter for rooftops, split systems, free-standing units and package systems and air handlers.

**Efficiency:** MERV 13 per ASHRAE Standard 52.2, meeting current requirements for LEED.

**Media:** Synthetic fibers in a uniform lofted media blanket.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 150° F (66° C).

**Ratings:** UL Class 2.

See Literature 1038 for more details.

Part Number	Nominal Size H x W x D (inches)	Height (inches)	Width (inches)	Depth (inches)	Airflow Capacity (cfm)	Media Area (sq. ft.)	Resistance @ Capacity (inches w.g.)	Pleats per LinearFoot
405413-001	20 x 16 x 2	19.50	15.50	1.75	1110	9.9	0.41	15
405413-002	20 x 20 x 2	19.50	19.50	1.75	1390	11.9	0.41	15
405413-003	25 x 20 x 2	24.50	19.50	1.75	1740	14.9	0.41	15
405413-004	25 x 16 x 2	24.50	15.50	1.75	1390	12.4	0.41	15
405413-005	24 x 24 x 2	23.50	23.50	1.75	2000	17.3	0.41	15
405413-006	24 x 12 x 2	23.50	23.50	1.75	1000	8.4	0.41	15
405413-014	20 x 12 x 2	19.50	19.50	1.75	835	7.4	0.41	15
405413-007	24 x 20 x 2	23.50	23.50	1.75	1670	14.3	0.41	15
405413-008	24 x 18 x 2	23.50	23.50	1.75	1500	13.0	0.41	15
405413-010	20 x 14 x 2	19.50	19.50	1.75	975	8.3	0.41	15
405413-011	25 x 14 x 2	24.50	24.50	1.75	1220	10.4	0.41	15
405413-011	25 x 14 x 2	24.50	13.50	1.75	1220	10.4	0.41	15
405413-012	24 x 16 x 2	23.50	23.50	1.75	1335	11.8	0.41	15
405414-001	24 x 24 x 4	23.38	23.38	3.75	2000	27.7	0.35	11
405414-002	24 x 12 x 4	23.38	11.38	3.75	1000	13.9	0.35	11
405414-003	20 x 20 x 4	19.38	19.38	3.75	1390	18.9	0.35	11
405414-004	20 x 16 x 4	19.38	15.38	3.75	1110	15.7	0.35	11
405414-005	25 x 16 x 4	24.38	15.38	3.75	1390	19.7	0.35	11
405414-006	25 x 20 x 4	24.38	19.38	3.75	1740	23.6	0.35	11
405414-007	24 x 20 x 4	23.38	19.38	3.75	1670	22.7	0.35	11
405414-008	24 x 18 x 4	23.38	17.38	3.75	1500	20.2	0.35	11
405414-009	24 x 16 x 4	23.38	15.38	3.75	1330	18.7	0.35	11

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# Type 44



## Advantages

- All-metal impingement type panel filters
- May be oiled on-site to increase efficiency
- Various media types available to suit application
- Economy of a cleanable renewable filter

**Description:** Cleanable, high velocity, low pressure drop air filters for the elimination of particulate (not water or mists).

**Typical applications:** Commercial or industrial processes.

**Efficiency:** 90% efficiency on particles 10-microns and larger.

**Media:** Alternate layers of flat and herringbone-crimp galvanized steel screen.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Airflow operating range:** Velocity of 450 fpm to 550 fpm, consult factory outside of this range.

**Ratings:** Rated by Underwriters Laboratories as UL Class 900.

See Literature 2001 for more details.

Part Number	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
Contact factory	20 x 16 x 4	19.38 x 15.38 x 4	0.24	85.2
Contact factory	20 x 20 x 4	19.38 x 19.38 x 4	0.24	106.4
Contact factory	25 x 16 x 4	24.38 x 15.38 x 4	0.24	133.0
Contact factory	25 x 20 x 4	24.38 x 19.38 x 4	0.24	106.4
120969-001	24 x 12 x 4	23.38 x 11.38 x 4	0.24	76.5
120969-002	24 x 24 x 4	23.38 x 23.38 x 4	0.24	153.2
000172-001	20 x 16 x 2	19.38 x 15.38 x 2	0.12	42.6
000172-003	20 x 20 x 2	19.38 x 19.38 x 2	0.12	53.2
000172-005	24 x 24 x 2	23.38 x 23.38 x 2	0.12	76.6
000172-002	25 x 16 x 2	24.38 x 15.38 x 2	0.12	53.2
000172-004	25 x 20 x 2	24.38 x 19.38 x 2	0.12	66.5
005661-001	20 x 16 x 1	19.38 x 15.38 x 1	0.10	21.5
005661-005	20 x 20 x 1	19.38 x 19.38 x 1	0.10	26.9
005661-007	25 x 20 x 1	24.38 x 19.38 x 1	0.10	33.6
005661-003	25 x 16 x 1	24.38 x 15.38 x 1	0.10	26.9
Contact factory	24 x 24 x 1	23.38 x 23.38 x 1	0.10	38.7

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Metal Filters



Advantages

- Low resistance to airflow, minimal energy usage
- Easy to clean
- Excellent for removal of lint and other bulky airborne contaminants
- Can be used in high temperature applications

**Description:** Permanent cleanable metal panel filter with low resistance to airflow.  
**Typical applications:** Removal of lint or bulky airborne particulate in commercial or industrial processes.

**Efficiency:** Over 80% on lint particulate.

**Media:** Zinc-electroplated steel meshed screen formed into corrugated and flat layers.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Airflow operating range:** Velocity of 450 fpm to 550 fpm, consult factory outside of this range.

**Ratings:** UL Class 900.

See Literature 2003FS for more details.

Part Number	Depth (inches)	Nominal Size H x W (inches)	Actual Height (inches)	Actual Width (inches)	Airflow @ Low (cfm)	Airflow @ High (cfm)	Initial Resistance @ Low (inches w.g.)	Initial Resistance @ High (inches w.g.)
037590-001	1	20 X 16	19.5	15.5	670	1000	0.04	0.08
037590-002	1	25 X 16	24.5	15.5	840	1250	0.04	0.08
037590-003	1	20 X 20	19.5	19.5	840	1250	0.04	0.08
037590-004	1	25 X 20	24.5	19.5	1030	1530	0.04	0.08
Contact Factory	1	24 X 24	23.5	23.5	1210	1810	0.04	0.08
Contact Factory	1	24 X 12	23.5	11.5	605	905	0.04	0.08
037591-002	2	20 X 16	19.5	15.5	632	940	0.06	0.11
037591-003	2	25 X 16	24.5	15.5	810	1200	0.06	0.11
037591-004	2	20 X 20	19.5	19.5	810	1200	0.06	0.11
037591-005	2	25 x 20	24.5	19.5	1030	1530	0.06	0.11
037591-006	2	24 X 24	23.5	23.5	1210	1810	0.06	0.11
Contact Factory	2	24 X 12	23.5	11.5	605	905	0.06	0.11

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# ECO<sup>®</sup> Moisture Separator



## Advantages

- Pre-drilled weeping holes for drainage or reclaim of valuable process oils
- Optional coalescer pad available for increased efficiency

**Description:** Cleanable, all-metal panel filter designed specifically for the removal of airborne moisture droplets.

**Typical applications:** High moisture situations in commercial or industrial processes, or oil-laden industrial applications. Includes weeping holes for drainage or reclaim of airborne oil or mists.

**Efficiency:** 98%+ on droplets 20 microns and larger.

**Media:** Alternate layers of flat and serpentine crimped galvanized screen.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Airflow operating range:** Velocity of 450 fpm to 550 fpm, consult factory outside of this range.

**Ratings:** N/A

See Literature 2003 for more details.

Part Number	Application	Nominal Size (H x W x D inches)	Actual Height (inches)	Actual Width (inches)	Rated Airflow (cfm)	Weight (lbs.)
<b>Galvanized Steel</b>						
064649-001	For built-up banks	24 x 24 x 4	23.38	23.38	2000	19
064649-002	For built-up banks	24 x 12 x 4	23.38	11.38	1000	10
064649-003	For built-up banks	12 x 24 x 4	11.38	23.38	1000	10
064649-004	For side access housings (includes sealing gasket on vertical side)	24 x 24 x 4	23.38	23.38	2000	19
064649-005	For side access housings (includes sealing gasket on vertical side)	24 x 12 x 4	23.38	11.38	1000	10
064649-006	For side access housings (includes sealing gasket on vertical side)	12 x 24 x 4	11.38	23.38	1000	10
<b>Stainless Steel</b>						
098512-001	For built-up banks	24 x 24 x 4	23.38	23.38	2000	19
098512-002	For built-up banks	12 x 24 x 4	11.38	23.38	1000	10
098512-003	For built-up banks	24 x 12 x 4	23.38	11.38	1000	10
098512-004	For side access housings (includes sealing gasket on vertical side)	24 x 24 x 4	23.38	23.38	2000	19
098512-005	For side access housings (includes sealing gasket on vertical side)	12 x 24 x 4	11.38	23.38	1000	10
098512-006	For side access housings (includes sealing gasket on vertical side)	24 x 12 x 4	23.38	11.38	1000	10

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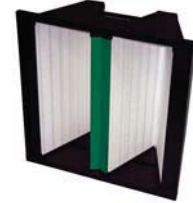
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# Hi-Flo<sup>®</sup> ES



## Advantages

- Lowest initial and average pressure drop to ensure the lowest energy cost in the industry
- May be used without a prefilter to further reduce energy costs
- Longest lasting pocket style filter available in the industry, less changes and less landfill waste
- Proprietary high loft air laid media, exclusive to Camfil, depth optimized for the highest dust holding capacity
- Tapered pockets offer Controlled Media Spacing (CMS) for full use of media area
- Transport handle built into frame for ease of filter service
- Molded plastic frame, no jagged edges, no pocket damage, no air bypass
- Guaranteed to 10" w.g. without filter failure

**Description:** Multi-pocket high efficiency filters with tapered pleats and pockets available in 12", 22" and 30" depths.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, MERV 14, and MERV 15 and a MERV-A of 11, 13, 14 and 15 respectively, efficiency maintained throughout the life of the filter.

**Media:** Proprietary microfine glass media in a uniform high loft media blanket with a micro mesh media backing.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point

**Temperature:** Maximum continuous operating temperature of 158° F (70° C).

**Ratings:** ECI value of five stars, listed as UL 900 by Underwriters Laboratories.

See Literature 1211 for more details.

Part Number	Model	Nominal Size (H X W, inches)	Pocket Depth (inches)	Actual Dimensions (H X W X D, inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
405620A22	HFESMV15/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.62	71.45
405620A30	HFESMV15/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.56	97.03
405620B22	HFESMV15/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.62	57.16
405620B30	HFESMV15/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.56	77.62
405620D22	HFESMV15/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.62	47.16
405620D30	HFESMV15/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.56	63.98
405620C22	HFESMV15/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.62	35.73
405620C30	HFESMV15/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.56	48.52
405619A12	HFESMV14/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.63	39.21
405619A22	HFESMV14/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.45	71.45
405619A30	HFESMV14/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.41	97.03
405619B12	HFESMV14/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.63	31.37
405619B22	HFESMV14/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.45	57.16
405619B30	HFESMV14/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.41	77.62



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**Bag Filters**

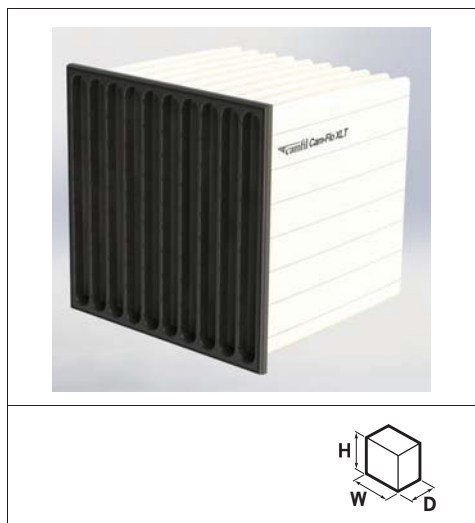
Part Number	Model	Nominal Size (H X W, inches)	Pocket Depth (inches)	Actual Dimensions (H X W X D, inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
405619D12	HFESMV14/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.63	25.81
405619D22	HFESMV14/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.45	47.16
405619D30	HFESMV14/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.41	63.98
405619C12	HFESMV14/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.63	19.61
405619C22	HFESMV14/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.45	35.73
405619C30	HFESMV14/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.41	48.52
405618A12	HFESMV13/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.45	39.21
405618A22	HFESMV13/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.40	71.45
405618A30	HFESMV13/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.36	97.03
405618B12	HFESMV13/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.45	31.37
405618B22	HFESMV13/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.40	57.16
405618B30	HFESMV13/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.36	77.62
405618D12	HFESMV13/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.45	25.81
405618D22	HFESMV13/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.40	47.16
405618D30	HFESMV13/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.36	63.98
405618C12	HFESMV13/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.45	19.61
405618C22	HFESMV13/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.40	35.73
405618C30	HFESMV13/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.36	48.52
405617A12	HFESMV11/24/24/12/10	24 x 24	12	23.31 x 23.31 x 12	2000	0.35	39.21
405617A22	HFESMV11/24/24/22/10	24 X 24	22	23.31 x 23.31 x 22	2000	0.32	71.45
405617A30	HFESMV11/24/24/30/10	24 X 24	30	23.31 x 23.31 x 30	2000	0.29	97.03
405617B12	HFESMV11/24/20/12/8	24 X 20	12	23.31 x 19.31 x 12	1600	0.35	31.37
405617B22	HFESMV11/24/20/22/8	24 X 20	22	23.31 x 19.31 x 22	1600	0.32	57.16
405617B30	HFESMV11/24/20/30/8	24 X 20	30	23.31 x 19.31 x 30	1600	0.29	77.62
405617D12	HFESMV11/20/20/12/8	20 X 20	12	19.31 x 19.31 x 12	1320	0.35	25.81
405617D22	HFESMV11/20/20/22/8	20 X 20	22	19.31 x 19.31 x 22	1320	0.32	47.16
405617D30	HFESMV11/20/20/30/8	20 X 20	30	19.31 x 19.31 x 30	1320	0.29	63.98
405617C12	HFESMV11/24/12/12/5	24 X 12	12	23.31 x 11.31 x 12	1000	0.35	19.61
405617C22	HFESMV11/24/12/22/5	24 X 12	22	23.31 x 11.31 x 22	1000	0.32	35.73
405617C30	HFESMV11/24/12/30/5	24 X 12	30	23.31 x 11.31 x 30	1000	0.29	48.52

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.





# Cam-Flo XLT



## Advantages

- High strength synthetic media bag filter that maintains efficiency over time
- May be used in hostile environments, moisture, turbulence, etc., operational to 2500 cfm

**Description:** Multi-pocket, maintained high efficiency filter with synthetic media for commercial applications.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, and MERV 14 and MERV 11-A, MERV 13-A, and MERV 14-A.

**Media:** Synthetic media in a uniform high loft media blanket with a permeable media support backing.

**Maximum recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design or energy considerations may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 158° F (70° C).

**Ratings:** UL Class 900.

See Literature 1319 for more details.

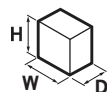
MERV MERV-A	Part Number	Model	Actual Dimensions (inches)	Rated Airflow (cfm)	Initial Resistance
MERV 14 MERV 14-A	405915A22	CFXLTMV14/24/24/22/10	23.31 x 23.31 x 22	2000	0.43"
	405915A30	CFXLTMV14/24/24/30/10	23.31 x 23.31 x 30	2000	0.39"
	405915B12	CFXLTMV14/24/20/12/8	23.31 x 19.31 x 12	1600	0.74"
	405915B22	CFXLTMV14/24/20/22/8	23.31 x 19.31 x 22	1600	0.43"
	405915B30	CFXLTMV14/24/20/30/8	23.31 x 19.31 x 30	1600	0.39"
	405915C12	CFXLTMV14/24/12/12/5	23.31 x 11.31 x 12	1000	0.74"
	405915C22	CFXLTMV14/24/12/22/5	23.31 x 11.31 x 22	1000	0.43"
	405915C30	CFXLTMV14/24/12/30/5	23.31 x 11.31 x 30	1000	0.39"
	405915D12	CFXLTMV14/20/20/12/8	19.31 x 19.31 x 12	1320	0.74"
	405915D22	CFXLTMV14/20/20/22/8	19.31 x 19.31 x 22	1320	0.43"
MERV 13 MERV 13-A	405915D30	CFXLTMV14/20/20/30/8	19.31 x 19.31 x 30	1320	0.39"
	405914A12	CFXLTMV13/24/24/12/10	23.31 x 23.31 x 12	2000	0.50"
	405914A22	CFXLTMV13/24/24/22/10	23.31 x 23.31 x 22	2000	0.37"
	405914A30	CFXLTMV13/24/24/30/10	23.31 x 23.31 x 30	2000	0.33"
	405914B12	CFXLTMV13/24/20/12/8	23.31 x 19.31 x 12	1600	0.50"
	405914B22	CFXLTMV13/24/20/22/8	23.31 x 19.31 x 22	1600	0.37"
	405914B30	CFXLTMV13/24/20/30/8	23.31 x 19.31 x 30	1600	0.33"
	405914C12	CFXLTMV13/24/12/12/5	23.31 x 11.31 x 12	1000	0.50"
	405914C22	CFXLTMV13/24/12/22/5	23.31 x 11.31 x 22	1000	0.37"
	405914C30	CFXLTMV13/24/12/30/5	23.31 x 11.31 x 30	1000	0.33"
MERV 11 MERV 11-A	405914D12	CFXLTMV13/20/20/12/8	19.31 x 19.31 x 12	1320	0.50"
	405914D22	CFXLTMV13/20/20/22/8	19.31 x 19.31 x 22	1320	0.37"
	405914D30	CFXLTMV13/20/20/30/8	19.31 x 19.31 x 30	1320	0.33"
	405913A12	CFXLTMV11/24/24/12/10	23.31 x 23.31 x 12	2000	0.25"
	405913A22	CFXLTMV11/24/24/22/10	23.31 x 23.31 x 22	2000	0.22"
	405913A30	CFXLTMV11/24/24/30/10	23.31 x 23.31 x 30	2000	0.20"
	405913B12	CFXLTMV11/24/20/12/8	23.31 x 19.31 x 12	1600	0.25"
	405913B22	CFXLTMV11/24/20/22/8	23.31 x 19.31 x 22	1600	0.22"
	405913B30	CFXLTMV11/24/20/30/8	23.31 x 19.31 x 30	1600	0.20"
	405913C12	CFXLTMV11/24/12/12/5	23.31 x 11.31 x 12	1000	0.25"
405913C22	CFXLTMV11/24/12/22/5	23.31 x 11.31 x 22	1000	0.22"	
405913C30	CFXLTMV11/24/12/30/5	23.31 x 11.31 x 30	1000	0.20"	
405913D12	CFXLTMV11/20/20/12/8	19.31 x 19.31 x 12	1320	0.25"	
405913D22	CFXLTMV11/20/20/22/8	19.31 x 19.31 x 22	1320	0.22"	
405913D30	CFXLTMV11/20/20/30/8	19.31 x 19.31 x 30	1320	0.20"	

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Hi-Flo®



Advantages

- Longest lasting pocket style filter available in the industry
- Proprietary media, exclusive to Camfil, optimized for the highest dust holding capacity
- Controlled Media Spacing (CMS) for longer life
- Controlled Media Spacing (CMS) for longer life

**Description:** Multi-pocket high efficiency filters with tapered pleats and pocket stitching.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 9, MERV 11, MERV 13, MERV 14 and MERV-A of 9, 11, 13, and 14 respectively.

**Media:** Microfine glass media in a uniform high loft media blanket with a synthetic micro mesh media backing.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point

**Temperature:** Maximum continuous operating temperature of 158° F (70° C).

**Ratings:** ECI value of five stars, UL Class 2.

See Literature 1203 for more details.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

Model Number HF, * insert MERV Efficiency	Number of Pockets	Nominal Size (H x W x D, inches)	Rated Airflow (cfm)	M14 Initial Resistance (inches w.g.)	M13 Initial Resistance (inches w.g.)	M11 Initial Resistance (inches w.g.)	M9 Initial Resistance (inches w.g.)	Media Area (sq. ft.)
*/24/24/32/12	12	24 x 24 x 32	2500	0.54	0.40	0.27	0.21	129
*/24/20/32/9	9	24 x 20 x 32	1875	0.54	0.40	0.27	0.21	97
*/24/12/32/6	6	24 x 12 x 32	1250	0.54	0.40	0.27	0.21	65
*/20/20/32/9	9	20 x 20 x 32	1575	0.54	0.40	0.27	0.21	81
*/24/24/15/12	12	24 x 24 x 15	1500	0.49	0.34	0.21	0.15	58
*/24/20/15/9	9	24 x 20 x 15	1100	0.49	0.34	0.21	0.15	44
*/24/12/15/6	6	24 x 12 x 15	750	0.49	0.34	0.21	0.15	29
*/20/20/15/9	9	20 x 20 x 15	950	0.49	0.34	0.21	0.15	37
*/24/24/30/10	10	24 x 24 x 30	2400	0.69	0.46	0.29	0.22	101
*/24/20/30/8	8	24 x 20 x 30	1900	0.69	0.46	0.29	0.22	81
*/24/12/30/5	5	24 x 12 x 30	1200	0.69	0.46	0.29	0.22	50
*/20/20/30/8	8	20 x 20 x 30	1625	0.69	0.46	0.29	0.22	68
*/24/24/22/10	10	24 x 24 x 22	1750	0.54	0.36	0.22	0.15	73
*/24/20/22/8	8	24 x 20 x 22	1400	0.54	0.36	0.22	0.15	58
*/24/12/22/5	5	24 x 12 x 22	875	0.54	0.36	0.22	0.15	36
*/20/20/22/8	8	20 x 20 x 22	1175	0.54	0.36	0.22	0.15	49
*/24/24/36/8	8	24 x 24 x 36	2400	0.69	0.46	0.29	0.22	97
*/24/20/36/7	7	24 x 20 x 36	1900	0.69	0.46	0.29	0.22	85
*/24/12/36/4	4	24 x 12 x 36	1200	0.69	0.46	0.29	0.22	49

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## Bag Filters

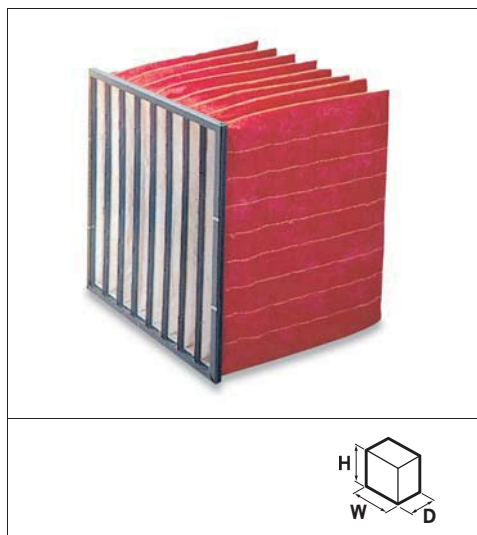
Model Number HF, * insert MERV Efficiency	Number of Pockets	Nominal Size (H x W x D, inches)	Rated Airflow (cfm)	M14 Initial Resistance (inches w.g.)	M13 Initial Resistance (inches w.g.)	M11 Initial Resistance (inches w.g.)	M9 Initial Resistance (inches w.g.)	Media Area (sq. ft.)
*/20/20/36/7	7	20 x 20 x 36	1625	0.69	0.46	0.29	0.22	71
*/24/24/30/8	8	24 x 24 x 30	2000	0.6	0.40	0.25	0.18	81
*/24/20/30/7	7	24 x 20 x 30	1750	0.6	0.40	0.25	0.18	70
*/24/12/30/4	4	24 x 12 x 30	1000	0.6	0.40	0.25	0.18	40
*/20/20/30/7	7	20 x 20 x 30	1450	0.6	0.40	0.25	0.18	59
*/24/24/22/8	8	24 x 24 x 22	1750	0.57	0.38	0.24	0.17	58
*/24/20/22/7	7	24 x 20 x 22	1500	0.57	0.38	0.24	0.17	51
*/24/12/22/4	4	24 x 12 x 22	875	0.57	0.38	0.24	0.17	29
*/20/20/22/7	7	20 x 20 x 22	1300	0.57	0.38	0.24	0.17	43
*/24/24/36/6	6	24 x 24 x 36	1750	0.54	0.35	0.21	0.15	76
*/24/20/36/5	5	24 x 20 x 36	1500	0.54	0.35	0.21	0.15	63
*/24/12/36/3	3	24 x 12 x 36	875	0.54	0.35	0.21	0.15	38
*/20/20/36/5	5	20 x 20 x 36	1225	0.54	0.35	0.21	0.15	53
*/24/24/30/6	6	24 x 24 x 30	1750	0.56	0.37	0.23	0.16	63
*/24/20/30/5	5	24 x 20 x 30	1500	0.56	0.37	0.23	0.16	52
*/24/12/30/3	3	24 x 12 x 30	875	0.56	0.37	0.23	0.16	31
*/20/20/30/5	5	20 x 20 x 30	1225	0.56	0.37	0.23	0.16	44
*/24/24/22/6	6	24 x 24 x 22	1750	0.71	0.46	0.28	0.18	45
*/24/20/22/5	5	24 x 20 x 22	1500	0.71	0.46	0.28	0.18	38
*/24/12/22/3	3	24 x 12 x 22	875	0.71	0.46	0.28	0.18	23
*/20/20/22/5	5	20 x 20 x 22	1225	0.71	0.46	0.28	0.18	32

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# S-Flo



## Advantages

- Synthetic media for high strength and efficient removal of nuisance contaminants such as pollen, paper dust and atmospheric impurities
- Economical choice for commercial and industrial applications

**Description:** Multi-pocket high efficiency air filters with synthetic media for commercial or industrial applications.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13 and MERV 14.

**Media:** Synthetic media in a uniform high loft media blanket with a permeable media support backing.

**Recommended final pressure drop:** 1.0" w.g. at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 158° F (70° C)

**Remarks:** ECI value of three stars, UL 900 listed.

See Literature sheet 1205 for more details.

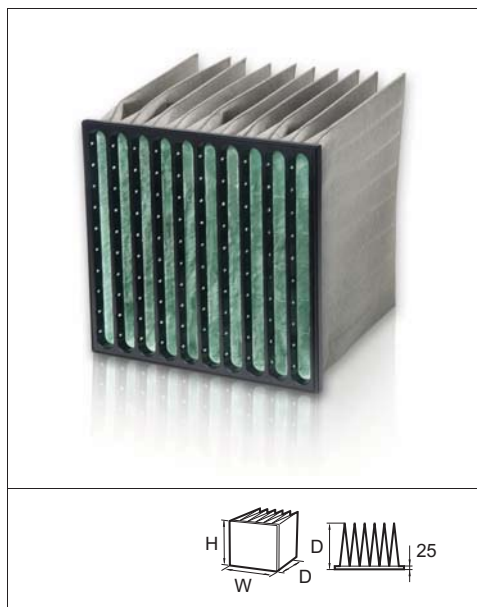
Model Number (* = SF(insert MERV))	Number of Pockets	Nominal Size (H x W x D, inches)	Rated Airflow (cfm)	M14 Initial Resistance (inches w.g.)	M13 Initial Resistance (inches w.g.)	M11 Initial Resistance (inches w.g.)	M9 Initial Resistance (inches w.g.)	Media Area (sq. ft.)
*/24/24/15/12	12	24 x 24 x 15	1500	0.35	0.28	0.21	0.18	58
*/24/20/15/9	9	24 x 20 x 15	1100	0.35	0.28	0.21	0.18	44
*/24/12/15/6	6	24 x 12 x 15	750	0.35	0.28	0.21	0.18	29
*/20/20/15/9	9	20 x 20 x 15	950	0.35	0.28	0.21	0.18	37
*/24/24/30/10	10	24 x 24 x 30	2400	0.51	0.38	0.32	0.26	101
*/24/20/30/8	8	24 x 20 x 30	1900	0.51	0.38	0.32	0.26	81
*/24/12/30/5	5	24 x 12 x 30	1200	0.51	0.38	0.32	0.26	50
*/20/20/30/8	8	20 x 20 x 30	1625	0.51	0.38	0.32	0.26	68
*/24/24/22/10	10	24 x 24 x 22	1750	0.38	0.29	0.23	0.18	73
*/24/20/22/8	8	24 x 20 x 22	1400	0.38	0.29	0.23	0.18	58
*/24/12/22/5	5	24 x 12 x 22	875	0.38	0.29	0.23	0.18	36
*/20/20/22/8	8	20 x 20 x 22	1175	0.38	0.29	0.23	0.18	49
*/24/24/30/8	8	24 x 24 x 30	2000	0.45	0.35	0.27	0.22	81
*/24/20/30/7	7	24 x 20 x 30	1750	0.45	0.35	0.27	0.22	70
*/24/12/30/4	4	24 x 12 x 30	1000	0.45	0.35	0.27	0.22	40
*/20/20/30/7	7	20 x 20 x 30	1450	0.45	0.35	0.27	0.22	59
*/24/24/22/8	8	24 x 24 x 22	1750	0.42	0.34	0.25	0.21	58
*/24/20/22/7	7	24 x 20 x 22	1500	0.42	0.34	0.25	0.21	51
*/24/12/22/4	4	24 x 12 x 22	875	0.42	0.34	0.25	0.21	29
*/20/20/22/7	7	20 x 20 x 22	1300	0.42	0.34	0.25	0.21	43
*/24/24/30/6	6	24 x 24 x 30	1750	0.46	0.38	0.29	0.24	63
*/24/20/30/5	5	24 x 20 x 30	1500	0.46	0.38	0.29	0.24	52
*/24/12/30/3	3	24 x 12 x 30	875	0.46	0.38	0.29	0.24	31
*/20/20/30/5	5	20 x 20 x 30	1225	0.46	0.38	0.29	0.24	44
*/24/24/22/6	6	24 x 24 x 22	1750	0.53	0.43	0.32	0.25	45
*/24/20/22/5	5	24 x 20 x 22	1500	0.53	0.43	0.32	0.25	38
*/24/12/22/3	3	24 x 12 x 22	875	0.53	0.43	0.32	0.25	23
*/20/20/22/5	5	20 x 20 x 22	1225	0.53	0.43	0.32	0.25	32

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# City-Flo XL



## Advantages

- Combined particulate and molecular contaminant filter
- Low initial pressure drop
- Newly developed conical pocket design
- Diecast, stable and aerodynamically designed front frame

**Filter type:** Particulate and molecular filter.

**Frame:** Diecast plastic frame.

**Filter media:** Fine fiber glass media and carbon with broad spectrum performance.

**Efficiency:** MERV 13 particulate efficiency and minimum 30% ozone removal efficiency.

**Temperature/Humidity:** Maximum operating temperature 122° F (50° C), 70% RH maximum for optimum adsorption.

See Camfil Literature City-Flo XL for additional details.

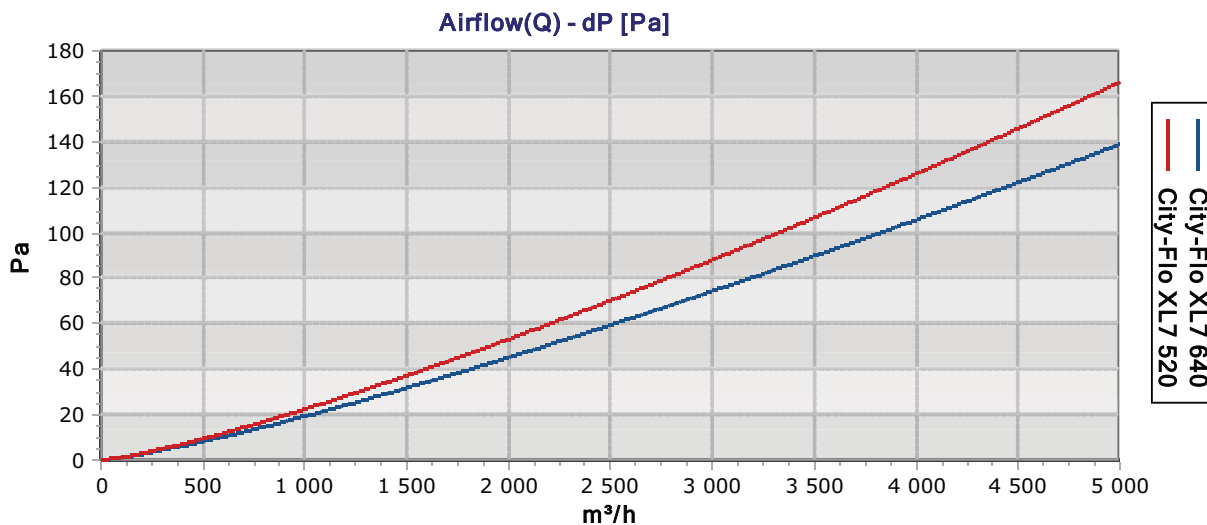
Camfil Part Number	Camfil Model Number	Nominal Dimensions (H x W, inches)	Pocket Depth	Actual Dimensions (inches)	Rated Airflow (cfm)	Initial Resistance (inches, w.g.)	Shipping Weight (lbs)
405780A22	CFMV13/24/24/22/10	24 x 24	22	23.31 x 23.31 x 22	2000	0.40	7.7
405780B22	CFMV13/24/20/22/8	24 x 20		23.31 x 19.31 x 22	1600		6.4
405780C22	CFMV13/24/12/22/5	24 x 12		23.31 x 11.31 x 22	1000		4.0
405780D22	CFMV13/20/20/22/8	20 x 20		19.31 x 19.31 x 22	1320		5.3

### DATA NOTES

MERV, Minimum Efficiency Reporting Value per ASHRAE Filter Testing Standard 52.2.

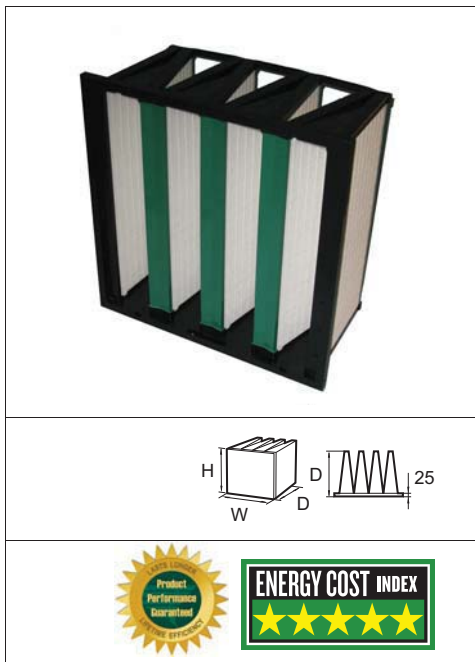
Maximum operating temperature 122° F (50° C). 70% RH maximum for optimum adsorption.

Schedule air filters for change when initial pressure drop has doubled. Final pressure drop should not exceed 1.50" w.g.



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# Durafil® ES



## Advantages

- Longest lasting high efficiency filter
- Lowest Life-Cycle Cost (LCC) filter available
- Fine fiber ensures that filter will maintain its efficiency throughout its life in the system

**Description:** High capacity, high efficiency, V-style air filter in an all plastic enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, MERV 14, MERV 16 and MERV-A of 11, 13, 14 and 16 respectively.

**Media:** Microfine glass media in a mini-pleat design formed into multiple V-bank media packs.

**Recommended final pressure drop:** 1.50" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 175° F (79° C).

**Ratings:** ECI value of five stars, UL 900.

See Literature 1515 for more details.

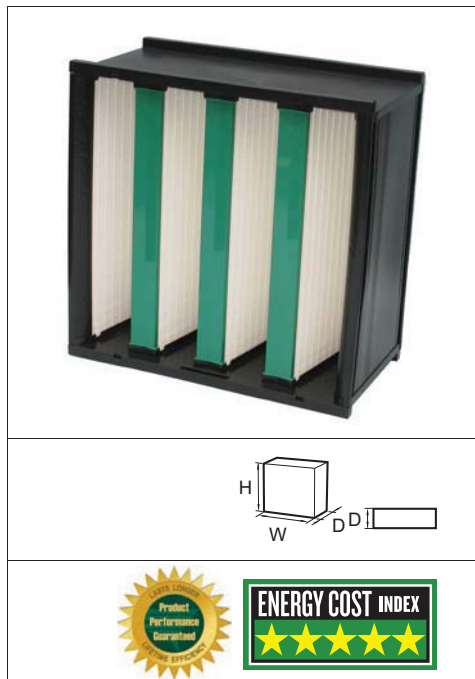
Part Number	Model Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
855080-014	DU4V-ES-2424-MV16	MERV 16	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.60	200
855080-030	DU4V-ES-2024-MV16	MERV 16	20 x 24 x 12	19.38 x 23.38 x 11.50	1500	0.60	160
855080-021	DU4V-ES-1224-MV16	MERV 16	12 x 24 x 12	11.38 x 23.38 x 11.50	1000	0.60	100
855080-188	DU4V-ES-2020-MV16	MERV 16	20 x 20 x 12	19.38 x 19.38 x 11.50	1250	0.80	125
855080-009	DU4V-ES-2424-MV14	MERV 14	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.31	200
855080-006	DU4V-ES-2024-MV14	MERV 14	20 x 24 x 12	19.38 x 23.38 x 11.50	1500	0.31	160
855080-003	DU4V-ES-1224-MV14	MERV 14	12 x 24 x 12	11.38 x 23.38 x 11.50	1000	0.31	100
855080-065	DU4V-ES-2020-MV14	MERV 14	20 x 20 x 12	19.38 x 19.38 x 11.50	1250	0.37	125
855080-008	DU4V-ES-2424-MV13	MERV 13	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.27	200
855080-005	DU4V-ES-2024-MV13	MERV 13	20 x 24 x 12	19.38 x 23.38 x 11.50	1500	0.27	160
855080-002	DU4V-ES-1224-MV13	MERV 13	12 x 24 x 12	11.38 x 23.38 x 11.50	1000	0.27	100
855080-066	DU4V-ES-2020-MV13	MERV 13	20 x 20 x 12	19.38 x 19.38 x 11.50	1250	0.33	125
855080-007	DU4V-ES-2424-MV11	MERV 11	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.21	200
855080-004	DU4V-ES-2024-MV11	MERV 11	20 x 24 x 12	19.38 x 23.38 x 11.50	1500	0.21	160
855080-001	DU4V-ES-1224-MV11	MERV 11	12 x 24 x 12	11.38 x 23.38 x 11.50	1000	0.21	100
855080-063	DU4V-ES-2020-MV11	MERV 11	20 x 20 x 12	19.38 x 19.38 x 11.50	1250	0.27	125

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# Durafil® ESB



## Advantages

- Dual headers for front loading filter installations
- Lowest Life-Cycle Cost (LCC) filter available
- Fine fiber ensures that the filter will maintain efficiency throughout its life in the system

**Description:** High capacity, high efficiency, V-style air filter in an all plastic enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers that require a filter with dual headers.

**Efficiency:** MERV 11, MERV 13, MERV 14 and MERV 16 and a MERV-A of 11, 13 14 and 16 respectively.

**Media:** Microfine glass media in a mini-pleat design formed into multiple V-bank media packs.

**Recommended final pressure drop:** 1.50" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 175° F (79° C).

**Ratings:** ECI value of five stars, UL 900.

See Literature 1515B for more details.

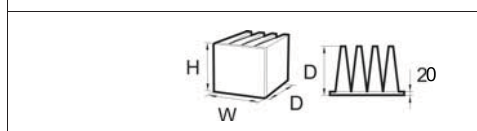
Model	Part Number	MERV & MERV-A	Nominal Size (inches)	Actual Size (Inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
DU4V-ESB-2424-MV16	855080-171		24 x 24 x 12	23.38 x 23.38 x 12.38	2000		200
DU4V-ESB-2024-MV16	855080-172	16	20 x 24 x 12	19.38 x 23.38 x 12.38	1500	0.62	160
DU4V-ESB-1224-MV16	855080-173		12 x 24 x 12	11.38 x 23.38 x 12.38	1000		100
DU4V-ESB-2424-MV14	855080-174		24 x 24 x 12	23.38 x 23.38 x 12.38	2000		200
DU4V-ESB-2024-MV14	855080-175	14	20 x 24 x 12	19.38 x 23.38 x 12.38	1500	0.34	160
DU4V-ESB-1224-MV14	855080-176		12 x 24 x 12	11.38 x 23.38 x 12.38	1000		100
DU4V-ESB-2424-MV13	855080-177		24 x 24 x 12	23.38 x 23.38 x 12.38	2000		200
DU4V-ESB-2024-MV13	855080-178	13	20 x 24 x 12	19.38 x 23.38 x 12.38	1500	0.32	160
DU4V-ESB-1224-MV13	855080-179		12 x 24 x 12	11.38 x 23.38 x 12.38	1000		100
DU4V-ESB-2424-MV11	855080-180		24 x 24 x 12	23.38 x 23.38 x 12.38	2000		200
DU4V-ESB-2024-MV11	855080-181	11	20 x 24 x 12	19.38 x 23.38 x 12.38	1500	0.26	160
DU4V-ESB-1224-MV11	855080-182		12 x 24 x 12	11.38 x 23.38 x 12.38	1000		100

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# Durafil® 2V



## Advantages

- Guaranteed to 10" w.g. for the highest structural integrity of any box style filter
- Unaffected by varying airflow, excellent for VAV systems
- Design exposes full media area for even loading and longer life when compared to old style aluminum separator type filters
- Easier to service, includes handle, light weight, when compared to box type filters

**Description:** High efficiency, V-style air filter in an all plastic enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, MERV 14 and a MERV-A of 11, 13 and 14 respectively.

**Media:** Microfine glass media in a mini-pleat design formed into multiple V-bank media packs.

**Recommended final pressure drop:** 1.50" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 175° F (79° C).

**Ratings:** ECI value of four stars, UL 900.

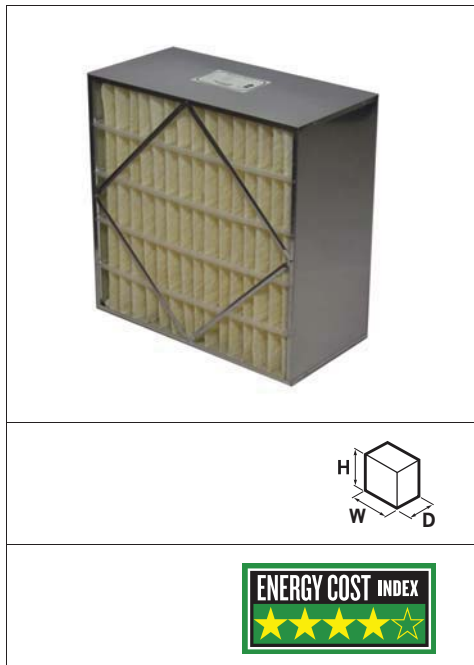
See Literature 1519 for more details.

Part Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
855080-142	MERV 14	24 X 24 x 12	23.38 X 23.38 x 11	2000	0.55	100
855080-140	MERV 14	24 X 12 x 12	23.38 X 11.38 x 11	850	0.55	45
855080-141	MERV 14	24 X 20 x 12	23.38 X 19.38 x 11	1610	0.55	82
855080-139	MERV 13	24 X 24 x 12	23.38 X 23.38 x 11	2000	0.43	100
855080-137	MERV 13	24 X 12 x 12	23.38 X 11.38 x 11	850	0.43	45
855080-138	MERV 13	24 X 20 x 12	23.38 X 19.38 x 11	1610	0.43	82
855080-136	MERV 11	24 X 24 x 12	23.38 X 23.38 x 11	2000	0.25	100
855080-134	MERV 11	24 X 12 x 12	23.38 X 11.38 x 11	850	0.25	45
855080-135	MERV 11	24 X 20 x 12	23.38 X 19.38 x 11	1610	0.25	82

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# Riga-Flo®



## Advantages

- Supported media unaffected by varying airflow or turbulence
- Microfine high loft media blanket has long life and maintains efficiency throughout the life of the filter
- Best in class, saves energy and lasts longer than other box style filters
- Guaranteed to 10" w.g. for the highest structural integrity of any box style filter

**Description:** High efficiency supported media box filter.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 9, MERV 11, MERV 13, MERV 14 and MERV-A of 9, 11, 13 and 14 respectively.

**Media:** Microfine glass media in a uniform high loft media blanket with a synthetic micro mesh media backing. (Non-metallic media backing).

**Recommended final pressure drop:** 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of four stars, UL 900.

Available in a 6-inch deep model also. See Literature 1303 for more details.

Part Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)
402994-003	MERV 14	24 X 24 x 12	23.38 X 23.38 X 11.50	2000	0.60
402994-006	MERV 14	24 X 12 x 12	23.38 X 11.38 X 11.50	1000	0.60
402994-009	MERV 14	24 X 20 x 12	23.38 X 19.38 X 11.50	1670	0.60
402994-012	MERV 14	20 X 20 x 12	19.38 X 19.38 X 11.50	1400	0.60
402994-002	MERV 13	24 X 24 x 12	23.38 X 23.38 X 11.50	2000	0.50
402994-005	MERV 13	24 X 12 x 12	23.38 X 11.38 X 11.50	1000	0.50
402994-008	MERV 13	24 X 20 x 12	23.38 X 19.38 X 11.50	1670	0.50
402994-011	MERV 13	20 X 20 x 12	19.38 X 19.38 X 11.50	1400	0.50
402994-001	MERV 11	24 X 24 x 12	23.38 X 23.38 X 11.50	2000	0.30
402994-004	MERV 11	24 X 12 x 12	23.38 X 11.38 X 11.50	1000	0.30
402994-007	MERV 11	24 X 20 x 12	23.38 X 19.38 X 11.50	1670	0.30
402994-010	MERV 11	20 X 20 x 12	19.38 X 19.38 X 11.50	1400	0.30
096026-004	MERV 9	24 X 24 x 12	23.38 X 23.38 X 11.50	2000	0.20
096026-008	MERV 9	24 X 12 x 12	23.38 X 11.38 X 11.50	1000	0.20
096026-012	MERV 9	24 X 20 x 12	23.38 X 19.38 X 11.50	1670	0.20
096026-016	MERV 9	20 X 20 x 12	19.38 X 19.38 X 11.50	1400	0.20
402993-003	MERV 14	24 X 24 x 6	23.38 X 23.38 X 5.88	1200	0.60
402993-006	MERV 14	24 X 12 x 6	23.38 X 11.38 X 5.88	600	0.60
402993-009	MERV 14	24 X 20 x 6	3.38 X 19.38 X 5.88	995	0.60
402993-012	MERV 14	20 X 20 x 6	19.38 X 19.38 X 5.88	840	0.60
402993-002	MERV 13	24 X 24 x 6	23.38 X 23.38 X 5.88	1200	0.50
402993-005	MERV 13	24 X 12 x 6	23.38 X 11.38 X 5.88	600	0.50
402993-008	MERV 13	24 X 20 x 6	3.38 X 19.38 X 5.88	995	0.50
402993-011	MERV 13	20 X 20 x 6	19.38 X 19.38 X 5.88	840	0.50
402993-001	MERV 11	24 X 24 x 6	23.38 X 23.38 X 5.88	1200	0.25
402993-004	MERV 11	24 X 12 x 6	23.38 X 11.38 X 5.88	600	0.25
402993-007	MERV 11	24 X 20 x 6	3.38 X 19.38 X 5.88	995	0.25
402993-010	MERV 11	20 X 20 x 6	19.38 X 19.38 X 5.88	840	0.25
097293-004	MERV 9	24 X 24 x 6	23.38 X 23.38 X 5.88	1200	0.08
097293-008	MERV 9	24 X 12 x 6	23.38 X 11.38 X 5.88	600	0.08
097293-012	MERV 9	24 X 20 x 6	3.38 X 19.38 X 5.88	995	0.08
097293-016	MERV 9	20 X 20 x 6	19.38 X 19.38 X 5.88	840	0.08



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# Riga-Flo® PH



## Advantages

- Supported media unaffected by varying airflow or turbulence
- Microfine high loft media blanket has long life and maintains efficiency throughout the life of the filter
- Includes 1" nominal header for side access or rear access built-up banks

**Description:** High efficiency supported media box filter with header for side access installations.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 9, MERV 11, MERV 13, MERV 14 and MERV-A of 9, 11, 13 and 14 respectively.

**Media:** Microfine glass media in a uniform high loft media blanket with a synthetic micro mesh media backing. (Non-metallic media backing).

**Recommended final pressure drop:** 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** ECI value of four stars, UL 900.

See Literature 1303PH for more details.

Part Number A Style Header (nominal 1")	Part Number B Style Header (nominal 1-1/4")	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)
402995-003	402996-003	MERV 14	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.70
402995-006	402996-006	MERV 14	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.70
402995-009	402996-009	MERV 14	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.70
402995-012	402996-012	MERV 14	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.70
402995-002	402996-002	MERV 13	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.60
402995-005	402996-005	MERV 13	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.60
402995-008	402996-008	MERV 13	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.60
402995-011	402996-011	MERV 13	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.60
402995-001	402996-001	MERV 11	24 X 24 x 12	23.38 X 23.38 x 11.50	2000	0.45
402995-004	402996-004	MERV 11	24 X 12 x 12	23.38 X 11.38 x 11.50	1000	0.45
402995-007	402996-007	MERV 11	24 X 20 x 12	23.38 X 19.38 x 11.50	1660	0.45
402995-010	402996-010	MERV 11	20 X 20 x 12	19.38 X 19.38 x 11.50	1400	0.45

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# Riga-V



## Advantages

- Supported media, in a unique "pleat within a pleat" configuration, unaffected by varying airflow or turbulence
- Low initial pressure drop and low cost per unit make the Riga-V an economical choice for commercial applications

**Description:** High efficiency supported media box filter with low initial pressure drop.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, and MERV 14.

**Media:** Lofted synthetic media formed into 2" deep mini-pleats and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 160° F (70° C).

**Ratings:** ECI value of three stars, UL 900.

See Literature 1414 for more details.

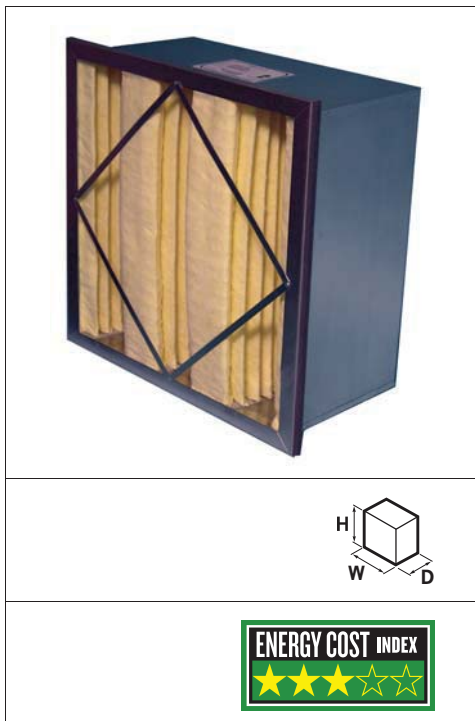
Model Number	MERV	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rate Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
404340-014	MERV 14	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.55	20.3
404340-034	MERV 14	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.55	28.3
404340-024	MERV 14	24 x 20 x 12	23.38 x 19.38 x 11.50	1670	0.55	34.0
404340-004	MERV 14	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.55	41.0
404340-013	MERV 13	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.38	20.3
404340-033	MERV 13	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.38	28.3
404340-023	MERV 13	24 x 20 x 12	23.38 x 19.38 x 11.50	1670	0.38	34.0
404340-003	MERV 13	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.38	41.0
404340-012	MERV 11	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.29	20.3
404340-032	MERV 11	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.29	28.3
404340-022	MERV 11	24 x 20 x 12	23.38 x 19.38 x 11.50	1670	0.29	34.0
404340-002	MERV 11	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.29	41.0

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# Riga-V PH



## Advantages

- Supported media, in a unique "pleat within a pleat" configuration, unaffected by varying airflow or turbulence
- Low initial pressure drop and low cost per unit make the Riga-V PH an economical choice for commercial applications
- Includes 1" nominal header for side access or rear access built-up banks

**Description:** High efficiency supported media box filter with header for side access installations.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, and MERV 14.

**Media:** Lofted synthetic media formed into 2" deep mini-pleats and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 160° F (70° C).

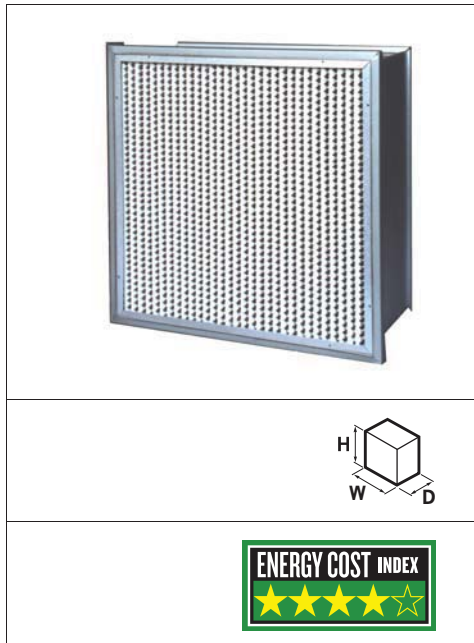
**Ratings:** ECI value of three stars, UL 900.

See Literature 1417 for more details.

Model Number	MERV	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq.ft.)
404411-014	MERV 14	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.65	18.8
404411-034	MERV 14	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.65	25.8
404411-024	MERV 14	24 x 20 x 12	23.38 x 19.38 x 11.50	1660	0.65	31.4
404411-004	MERV 14	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.65	37.6
404411-013	MERV 13	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.55	18.8
404411-033	MERV 13	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.55	25.8
404411-023	MERV 13	24 x 20 x 12	23.38 x 19.38 x 11.50	1660	0.55	31.4
404411-003	MERV 13	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.55	37.6
404411-012	MERV 11	24 x 12 x 12	23.38 x 11.38 x 11.50	1000	0.43	18.8
404411-032	MERV 11	20 x 20 x 12	19.38 x 19.38 x 11.50	1400	0.43	25.8
404411-022	MERV 11	24 x 20 x 12	23.38 x 19.38 x 11.50	1660	0.43	31.4
404411-002	MERV 11	24 x 24 x 12	23.38 x 23.38 x 11.50	2000	0.43	37.6

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# Aeropac®



## Advantages

- Wet-laid paper type media ideal for high particle capture performance and high humidity applications
- Fine fiber ensures that filter maintains its efficiency throughout its life in the system

**Description:** High efficiency box style air filter with wet-laid paper style media in an all-metal enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, MERV 14 and MERV-A of 11, 13 and 14 respectively.

**Media:** Microfine glass media formed into full pack depth pleats separated by corrugated aluminum separators.

**Recommended final pressure drop:** 1.50" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 200° F (90° C).

**Ratings:** ECI value of four stars, UL 900.

See Literature 1602 for more details.

Part Number	Model Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
402297-021	3HCP8-MV14-24246	MERV 14	24 x 24 x 6	23.31 x 23.31 x 5.69	1000	0.35	53
402297-022	3HCP8-MV14-24206	MERV 14	24 x 20 x 6	23.31 x 19.31 x 5.69	800	0.35	43
402297-023	3HCP8-MV14-24126	MERV 14	24 x 12 x 6	23.31 x 11.31 x 5.69	500	0.35	24
402297-024	3HCP8-MV14-25206	MERV 14	25 x 20 x 6	24.31 x 19.31 x 5.69	875	0.35	45
402297-025	3HCP8-MV14-25166	MERV 14	25 x 16 x 6	24.31 x 15.31 x 5.69	700	0.35	35
402297-026	3HCP8-MV14-24186	MERV 14	24 x 18 x 6	23.31 x 17.31 x 5.69	750	0.35	38
402297-027	3HCP8-MV14-20206	MERV 14	20 x 20 x 6	19.31 x 19.31 x 5.69	700	0.35	35
402297-028	3HCP8-MV14-20166	MERV 14	20 x 16 x 6	19.31 x 15.31 x 5.69	550	0.35	27
402297-029	3HCP8-MV14-12246	MERV 14	12 x 24 x 6	11.31 x 23.31 x 5.69	500	0.35	24
402297-030	3HCP8-MV14-20246	MERV 14	20 x 24 x 6	19.31 x 23.31 x 5.69	800	0.35	43
402298-021	3HCP8-MV14-242412	MERV 14	24 x 24 x 12	23.31 x 23.31 x 11.31	2000	0.65	105
402298-022	3HCP8-MV14-242012	MERV 14	24 x 20 x 12	23.31 x 19.31 x 11.31	1600	0.65	86
402298-023	3HCP8-MV14-241212	MERV 14	24 x 12 x 12	23.31 x 11.31 x 11.31	1000	0.65	48
402298-024	3HCP8-MV14-252012	MERV 14	25 x 20 x 12	24.31 x 19.31 x 11.31	1420	0.65	90
402298-025	3HCP8-MV14-251612	MERV 14	25 x 16 x 12	24.31 x 15.31 x 11.31	1400	0.65	70
402298-026	3HCP8-MV14-241812	MERV 14	24 x 18 x 12	23.31 x 17.31 x 11.31	1500	0.65	77
402298-027	3HCP8-MV14-202012	MERV 14	20 x 20 x 12	19.31 x 19.31 x 11.31	1400	0.65	70
402298-028	3HCP8-MV14-201612	MERV 14	20 x 16 x 12	19.31 x 15.31 x 11.31	1100	0.65	55
402298-029	3HCP8-MV14-122412	MERV 14	12 x 24 x 12	11.31 x 23.31 x 11.31	1000	0.65	47
402297-011	3HCP8-MV13-24246	MERV 13	24 x 24 x 6	23.31 x 23.31 x 5.69	1000	0.30	53
402297-012	3HCP8-MV13-24206	MERV 13	24 x 20 x 6	23.31 x 19.31 x 5.69	800	0.30	43
402297-013	3HCP8-MV13-24126	MERV 13	24 x 12 x 6	23.31 x 11.31 x 5.69	500	0.30	24



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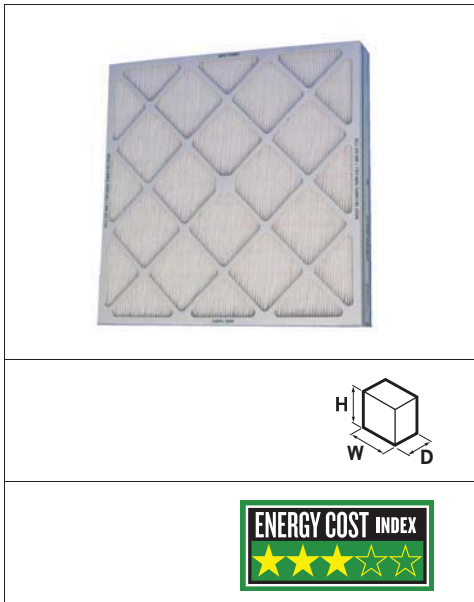
## Rigid Filters

Part Number	Model Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
402297-014	3HCP8-MV13-25206	MERV 13	25 x 20 x 6	24.31 x 19.31 x 5.69	875	0.30	45
402297-015	3HCP8-MV13-25166	MERV 13	25 x 16 x 6	24.31 x 15.31 x 5.69	700	0.30	35
402297-016	3HCP8-MV13-24186	MERV 13	24 x 18 x 6	23.31 x 17.31 x 5.69	750	0.30	38
402297-017	3HCP8-MV13-20206	MERV 13	20 x 20 x 6	19.31 x 19.31 x 5.69	700	0.30	35
402297-018	3HCP8-MV13-20166	MERV 13	20 x 16 x 6	19.31 x 15.31 x 5.69	550	0.30	27
402297-019	3HCP8-MV13-12246	MERV 13	12 x 24 x 6	11.31 x 23.31 x 5.69	500	0.30	24
402297-020	3HCP8-MV13-20246	MERV 13	20 x 24 x 6	19.31 x 23.31 x 5.69	800	0.30	43
402298-011	3HCP8-MV13-242412	MERV 13	24 x 24 x 12	23.31 x 23.31 x 11.31	2000	0.60	105
402298-012	3HCP8-MV13-242012	MERV 13	24 x 20 x 12	23.31 x 19.31 x 11.31	1600	0.60	86
402298-013	3HCP8-MV13-241212	MERV 13	24 x 12 x 12	23.31 x 11.31 x 11.31	1000	0.60	48
402298-014	3HCP8-MV13-252012	MERV 13	25 x 20 x 12	24.31 x 19.31 x 11.31	1420	0.60	90
402298-015	3HCP8-MV13-251612	MERV 13	25 x 16 x 12	24.31 x 15.31 x 11.31	1400	0.60	70
402298-016	3HCP8-MV13-241812	MERV 13	24 x 18 x 12	23.31 x 17.31 x 11.31	1500	0.60	77
402298-017	3HCP8-MV13-202012	MERV 13	20 x 20 x 12	19.31 x 19.31 x 11.31	1400	0.60	70
402298-018	3HCP8-MV13-201612	MERV 13	20 x 16 x 12	19.31 x 15.31 x 11.31	1100	0.60	55
402298-019	3HCP8-MV13-122412	MERV 13	12 x 24 x 12	11.31 x 23.31 x 11.31	1000	0.60	47
402298-020	3HCP8-MV13-202412	MERV 13	20 x 24 x 12	19.31 x 23.31 x 11.31	1600	0.60	86
402297-001	3HCP8-MV11-24246	MERV 11	24 x 24 x 6	23.31 x 23.31 x 5.69	1000	0.15	53
402297-002	3HCP8-MV11-24206	MERV 11	24 x 20 x 6	23.31 x 19.31 x 5.69	800	0.15	43
402297-003	3HCP8-MV11-24126	MERV 11	24 x 12 x 6	23.31 x 11.31 x 5.69	500	0.15	24
402297-004	3HCP8-MV11-25206	MERV 11	25 x 20 x 6	24.31 x 19.31 x 5.69	875	0.15	45
402297-005	3HCP8-MV11-25166	MERV 11	25 x 16 x 6	24.31 x 15.31 x 5.69	700	0.15	35
402297-006	3HCP8-MV11-24186	MERV 11	24 x 18 x 6	23.31 x 17.31 x 5.69	750	0.15	38
402297-007	3HCP8-MV11-20206	MERV 11	20 x 20 x 6	19.31 x 19.31 x 5.69	700	0.15	35
402297-008	3HCP8-MV11-20166	MERV 11	20 x 16 x 6	19.31 x 15.31 x 5.69	550	0.15	27
402297-009	3HCP8-MV11-12246	MERV 11	12 x 24 x 6	11.31 x 23.31 x 5.69	500	0.15	24
402297-010	3HCP8-MV11-20246	MERV 11	20 x 24 x 6	19.31 x 23.31 x 5.69	800	0.15	43
402298-001	3HCP8-MV11-242412	MERV 11	24 x 24 x 12	23.31 x 23.31 x 11.31	2000	0.45	105
402298-002	3HCP8-MV11-242012	MERV 11	24 x 20 x 12	23.31 x 19.31 x 11.31	1600	0.45	86
402298-003	3HCP8-MV11-241212	MERV 11	24 x 12 x 12	23.31 x 11.31 x 11.31	1000	0.45	48
402298-004	3HCP8-MV11-252012	MERV 11	25 x 20 x 12	24.31 x 19.31 x 11.31	1420	0.45	90
402298-005	3HCP8-MV11-251612	MERV 11	25 x 16 x 12	24.31 x 15.31 x 11.31	1400	0.45	70
402298-006	3HCP8-MV11-241812	MERV 11	24 x 18 x 12	23.31 x 17.31 x 11.31	1500	0.45	77
402298-007	3HCP8-MV11-202012	MERV 11	20 x 20 x 12	19.31 x 19.31 x 11.31	1400	0.45	70
402298-008	3HCP8-MV11-201612	MERV 11	20 x 16 x 12	19.31 x 15.31 x 11.31	1100	0.45	55
402298-009	3HCP8-MV11-122412	MERV 11	12 x 24 x 12	11.31 x 23.31 x 11.31	1000	0.45	47
402298-010	3HCP8-MV11-202412	MERV 11	20 x 24 x 12	19.31 x 23.31 x 11.31	1600	0.45	86

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.



# Opti-Pac®



## Advantages

- Short depth high efficiency filter saves valuable space in air handlers and conserves warehouse space
- Fine fiber ensures that filter maintains efficiency throughout its life in the system

**Description:** 4" deep high efficiency air filter in a high wet-strength beverage board frame.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 11, MERV 13, MERV 14 and MERV-A of 11, 13 and 14 respectively.

**Media:** Microfine glass media in a mini-pleat design bonded into a beverage board holding frame.

**Recommended final pressure drop:** 1.50" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 175° F (79° C).

**Ratings:** ECI value of three stars, UL 900.

See Literature 1608 for more details (also available with a header or in a plastic frame version).

Part Number	Model Number	MERV & MERV-A	Nominal Size (H x W x D inches)	Actual Size (H x W x D inches)	Rated Airflow (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)
855148-001	OPMV11-20X20X4	11	20 X 20 X 4	19.38 X 19.38 X 3.75	1390	0.33	80
855148-002	OPMV11-24X12x4	11	24 X 12 X 4	23.38 X 11.38 X 3.75	1000	0.33	53
855148-003	OPMV11-24X20X4	11	24 X 20 X 4	23.38 X 19.38 X 3.75	1670	0.33	97
855148-004	OPMV11-24X24X4	11	24 X 24 X 4	23.38 X 23.38 x 3.75	2000	0.33	113
855148-005	OPMV11-25X16X4	11	25 X 16 X 4	24.38 X 15.38 X 3.75	1390	0.33	80
855148-006	OPMV11-20X16X4	11	20 X 16 X 4	19.38 X 15.38 X 3.75	1100	0.33	64
855148-007	OPMV11-24X18X4	11	24 X 18 X 4	23.38 X 17.38 X 3.75	1500	0.33	87
855148-008	OPMV11-25X20X4	11	25 X 20 X 4	24.38 X 19.38 X 3.75	1740	0.33	101
855148-011	OPMV13-20X20X4	13	20 X 20 X 4	19.38 X 19.38 X 3.75	1390	0.47	80
855148-012	OPMV13-24X12x4	13	24 X 12 X 4	23.38 X 11.38 X 3.75	1000	0.47	53
855148-013	OPMV13-24X20X4	13	24 X 20 X 4	23.38 X 19.38 X 3.75	1670	0.47	97
855148-014	OPMV13-24X24X4	13	24 X 24 X 4	23.38 X 23.38 x 3.75	2000	0.47	113
855148-015	OPMV13-25X16X4	13	25 X 16 X 4	24.38 X 15.38 X 3.75	1390	0.47	80
855148-016	OPMV13-20X16X4	13	20 X 16 X 4	19.38 X 15.38 X 3.75	1100	0.47	64
855148-017	OPMV13-24X18X4	13	24 X 18 X 4	23.38 X 17.38 X 3.75	1500	0.47	87
855148-018	OPMV13-25X20X4	13	25 X 20 X 4	24.38 X 19.38 X 3.75	1740	0.47	101
855148-021	OPMV14-20X20X4	14	20 X 20 X 4	19.38 X 19.38 X 3.75	1390	0.60	80
855148-022	OPMV14-24X12x4	14	24 X 12 X 4	23.38 X 11.38 X 3.75	1000	0.60	53
855148-023	OPMV14-24X20X4	14	24 X 20 X 4	23.38 X 19.38 X 3.75	1670	0.60	97
855148-024	OPMV14-24X24X4	14	24 X 24 X 4	23.38 X 23.38 x 3.75	2000	0.60	113
855148-025	OPMV14-25X16X4	14	25 X 16 X 4	24.38 X 15.38 X 3.75	1390	0.60	80
855148-027	OPMV14-24X18X4	14	24 X 18 X 4	23.38 X 17.38 X 3.75	1500	0.60	87
855148-028	OPMV14-25X20X4	14	25 X 20 X 4	24.38 X 19.38 X 3.75	1740	0.60	101

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Summary HEPA/ULPA Filters & Filter Modules



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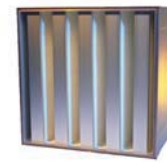
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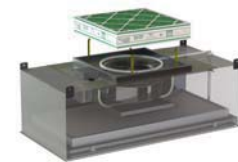
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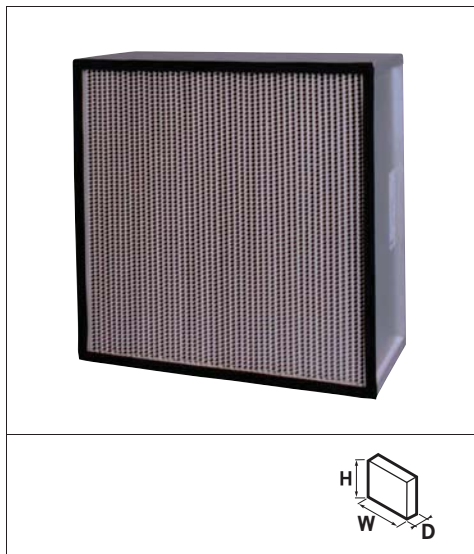


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# XS Absolute®



## Advantages

- Individually tested HEPA/ULPA filter in an enclosure assembled without penetrating fasteners
- Unique seamless poured-in-place gasket ensures leak free performance when installed into housings or built-up filter banks

**Description:** HEPA/ULPA grade filter in an all metal 16-gauge enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 99.97% at 0.3µ to 99.9995% at 0.3µ.

**Media:** Microfine glass media formed into pleats separated by corrugated aluminum separators.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 175° F (80° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 1801 for more details.

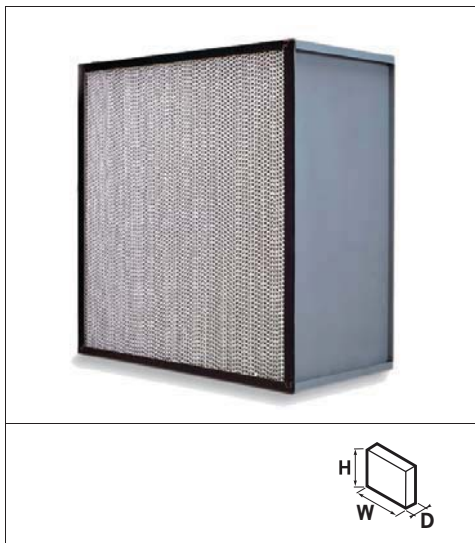
Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity @ 1.0" w.g.	Media Area (sq. ft.)	Shipping Weight (lbs.)
01XS-12Z12Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	12 x 12 x 11.50	230	33.4	22.4
01XS-23F11F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 11.38 x 11.50	460	64.5	28.8
01XS-24Z12Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	24 x 12 x 11.50	500	69.3	29.7
01XS-11F23F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	11.38 x 23.38 x 11.5	460	64.5	32.4
01XS-12Z24Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	12 x 24 x 11.50	500	69.3	33.3
01XS-23F23F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 23.38 x 11.50	1020	143.6	42.7
01XS-24Z24Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	24 x 24 x 11.50	1080	153.6	43.8
12XS-12Z12Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	12 x 12 x 11.50	230	33.4	22.4
12XS-23F11F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 11.38 x 11.50	460	64.5	28.8
12XS-24Z12Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	24 x 12 x 11.50	500	69.3	29.7
12XS-11F23F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	11.38 x 23.38 x 11.5	460	64.5	32.4
12XS-12Z24Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	12 x 24 x 11.50	500	69.3	33.3
12XS-23F23F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 23.38 x 11.50	1020	143.6	42.7
12XS-24Z24Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	24 x 24 x 11.50	1080	153.6	43.8
13XS-12Z12Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	12 x 12 x 11.50	190	33.4	22.4
13XS-23F11F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	23.38 x 11.38 x 11.50	370	64.5	28.4
13XS-24Z12Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	24 x 12 x 11.50	410	69.3	29.7
13XS-11F23F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	11.38 x 23.38 x 11.50	370	64.5	32.4
13XS-12Z24Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	12 x 24 x 11.50	410	69.3	33.3
13XS-23F23F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	23.38 x 23.38 x 11.50	840	143.6	42.7
13XS-24Z24Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	24 x 24 x 11.50	890	153.6	43.8

Replace \*\* in model number with 00 for no gasket, 1D for 1 gasket downstream, 1U for one gasket upstream, or 1B for a gasket on both sides.



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# XH Absolute®



## Advantages

- Individually tested high capacity HEPA/ULPA filter in an enclosure assembled without penetrating fasteners
- Unique seamless poured-in-place gasket ensures leak free performance when installed into housings or built-up filter banks

**Description:** High capacity HEPA/ULPA grade filter in an all metal 16-gauge enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 99.97% at 0.3µ to 99.9995% at 0.3µ.

**Media:** Microfine glass media formed into pleats separated by a corrugated aluminum separator.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 175° F (80° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filter. UL 900.

See Literature 1801XH for more details.

Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity @ 1.35" w.g.	Media Area (sq. ft.)	Shipping Weight (lbs.)
01XH-12Z12Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	12 x 12 x 11.50	430	67.5	23.6
01XH-23F11F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 11.38 x 11.50	850	134.6	30.8
01XH-24Z12Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	24 x 12 x 11.50	930	145.5	32.0
01XH-11F23F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	11.38 x 23.38 x 11.5	850	134.6	34.7
01XH-12Z24Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	12 x 24 x 11.50	930	145.5	35.6
01XH-23F23F12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 23.38 x 11.50	1890	287.5	47.5
01XH-24Z24Z12- ** -3-C-A-00-0/00	99.97% @ 0.3 µ	H	24 x 24 x 11.50	2000	301.0	48.5
12XH-12Z12Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	12 x 12 x 11.50	430	67.5	23.6
12XH-23F11F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 11.38 x 11.50	850	134.6	30.8
12XH-24Z12Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	24 x 12 x 11.50	930	145.5	32.0
12XH-11F23F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	11.38 x 23.38 x 11.5	850	134.6	34.7
12XH-12Z24Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	12 x 24 x 11.50	930	145.5	35.6
12XH-23F23F12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 23.38 x 11.50	1890	287.5	47.5
12XH-24Z24Z12- ** -3-C-A-00-0/00	99.99% @ 0.3 µ	J	24 x 24 x 11.50	2000	301.0	48.5
13XH-12Z12Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	12 x 12 x 11.50	350	67.5	23.6
13XH-23F11F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	23.38 x 11.38 x 11.50	700	134.6	30.8
13XH-24Z12Z12- ** -3-C-A-00-0/00	99.999% @ 0.3µ	F	24 x 12 x 11.50	770	145.5	32.0
13XH-11F23F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	11.38 x 23.38 x 11.50	700	134.6	34.7
13XH-12Z24Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	12 x 24 x 11.50	770	145.5	35.6
13XH-23F23F12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	23,38 x 23.38 x 11.50	1550	287.5	47.5
13XH-24Z24Z12- ** -3-C-A-00-0/00	99.999% @ 0.3 µ	F	24 x 24 x 11.50	1650	301.0	48.5

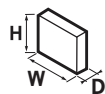
Replace \*\* in model number with 00 for no gasket, 1D for 1 gasket downstream, 1U for one gasket upstream, or 1B for a gasket on both sides.

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# PS Absolute®



## Advantages

- Individually tested standard capacity HEPA filter in an all-wood enclosing frame
- Unique seamless poured-in-place gasket ensures leak free performance when installed into housings or built-up filter banks

**Description:** HEPA grade filter in all-wood enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 99.97% at 0.3µ to 99.99% at 0.3µ.

**Media:** Microfine glass media formed into pleats separated by corrugated aluminum separators.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 175° F (80° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters.

See Literature 1803 for more details.

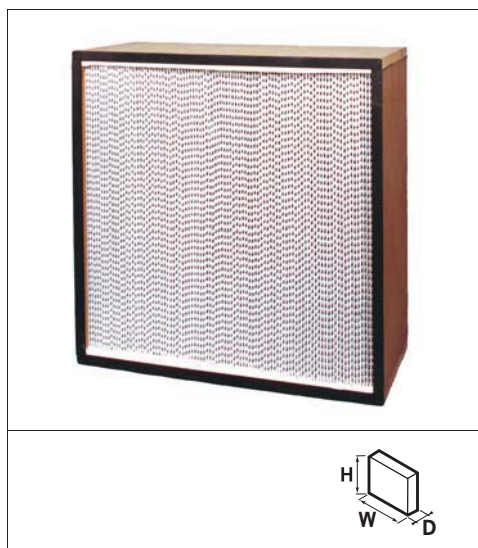
Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity @ 1.0" w.g.	Media Area (sq. ft.)	Shipping Weight (lbs)
01PS-12Z12Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	12 x 12 x 11.50	220	60.0	22.2
01PS-23F11F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	23.38 x 11.38 x 11.50	450	118.0	29.7
01PS-24Z12Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	24 x 12 x 11.50	490	130.0	30.9
01PS-11F23F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	11.38 x 23.38 x 11.5	430	118.0	33.6
01PS-12Z24Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	12 x 24 x 11.50	490	130.0	34.5
01PS-23F23F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	23.38 x 23.38 x 11.50	990	269.5	46.7
01PS-24Z24Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	24 x 24 x 11.50	1050	286.0	47.7
12PS-12Z12Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	12 x 12 x 11.50	220	60.0	22.2
12PS-23F11F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	23.38 x 11.38 x 11.50	450	118.0	29.7
12PS-24Z12Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	24 x 12 x 11.50	490	130.0	30.9
12PS-11F23F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	11.38 x 23.38 x 11.5	430	118.0	33.6
12PS-12Z24Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	12 x 24 x 11.50	490	130.0	34.5
12PS-23F23F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	23.38 x 23.38 x 11.50	990	269.5	46.7
12PS-24Z24Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	24 x 24 x 11.50	1050	286.0	47.7

Replace \*\* in model number with 00 for no gasket, 1D for 1 gasket downstream, 1U for one gasket upstream, or 1B for a gasket on both sides.



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# PH Absolute®



## Advantages

- Individually tested high capacity HEPA filter in an all-wood enclosing frame
- Unique seamless poured-in-place gasket ensures leak free performance when installed into housings or built-up filter banks

**Description:** High capacity HEPA grade filter in all-wood enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 99.97% at 0.3µ to 99.99% at 0.3µ.

**Media:** Microfine glass media formed into pleats separated by tapered corrugated aluminum separators.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 175° F (80° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters.

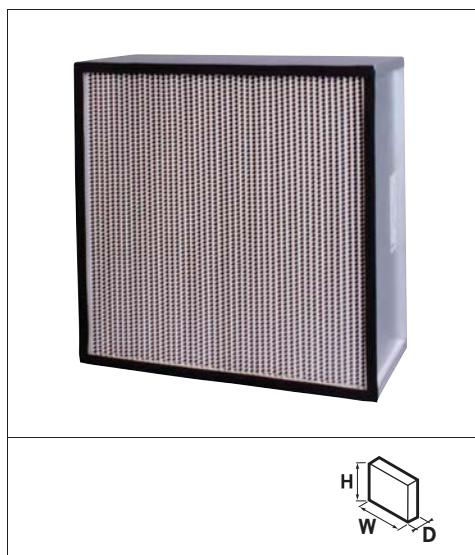
See Literature 1803H for more details.

Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity @ 1.35" w.g.	Media Area (sq.ft.)	Shipping Weight (lbs.)
01PH-12Z12Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	12 x 12 x 11.50	420	60.0	22.2
01PH-23F11F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	23.38 x 11.38 x 11.50	830	118.0	29.7
01PH-24Z12Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	24 x 12 x 11.50	910	130.0	30.9
01PH-11F23F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	11.38 x 23.38 x 11.5	830	118.0	33.6
01PH-12Z24Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	12 x 24 x 11.50	910	130.0	34.5
01PH-23F23F12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	23.38 x 23.38 x 11.50	1840	269.5	46.7
01PH-24Z24Z12- ** -3-V-A-00-0/00	99.97% @ 0.3µ	H	24 x 24 x 11.50	1950	286.0	47.7
12PH-12Z12Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	12 x 12 x 11.50	420	60.0	22.2
12PH-23F11F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	23.38 x 11.38 x 11.50	830	118.0	29.7
12PH-24Z12Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	24 x 12 x 11.50	910	130.0	30.9
12PH-11F23F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	11.38 x 23.38 x 11.5	830	118.0	33.6
12PH-12Z24Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	12 x 24 x 11.50	910	130.0	34.5
12PH-23F23F12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	23.38 x 23.38 x 11.50	1840	269.5	46.7
12PH-24Z24Z12- ** -3-V-A-00-0/00	99.99% @ 0.3µ	J	24 x 24 x 11.50	1950	286.0	47.7

Replace \*\* in model number with 00 for no gasket, 1D for 1 gasket downstream, 1U for one gasket upstream, or 1B for a gasket on both sides.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

# Micretain®



## Advantages

- Removes 99% of all known airborne bacteria
- Same construction and structural integrity as our X-series HEPA filters

**Description:** 95% DOP (99% ASHRAE) filter in an all metal 16-gauge enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 95% at 0.3μ.

**Media:** Microfine glass media formed into pleats separated by corrugated aluminum separators.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum operating temperature of 175° F (80° C).

**Ratings:** UL 900.

See Literature 1821 for more details.

Model Number	Nominal Size (inches)	Airflow Capacity (cfm)	Resistance @ Airflow (inches w.g.)	Media Area (sq. ft.)	Shipping Weight (lbs.)
07XS-12Z12Z12- ** -3-C-A-00-0/00	12 x 12 x 11.50	230	0.5	42.0	22.7
07XS-23F11F12- ** -3-C-A-00-0/00	23.38 x 11.38 x 11.50	460	0.5	83.6	29.2
07XS-24Z12Z12- ** -3-C-A-00-0/00	24 x 12 x 11.50	500	0.5	90.0	30.1
07XS-11F23F12- ** -3-C-A-00-0/00	11.38 x 23.38 x 11.5	460	0.5	83.6	32.9
07XS-12Z24Z12- ** -3-C-A-00-0/00	12 x 24 x 11.50	500	0.5	90.0	33.7
07XS-23F23F12- ** -3-C-A-00-0/00	23.38 x 23.38 x 11.50	1020	0.5	178.6	43.7
07XS-24Z24Z12- ** -3-C-A-00-0/00	24 x 24 x 11.50	1080	0.5	186.6	44.6
07XS-12Z12Z06- ** -3-C-A-00-0/00	12 x 12 x 5.88	160	0.5	20.7	14.9
07XS-23F11F06- ** -3-C-A-00-0/00	23.38 x 11.38 x 5.88	330	0.5	41.3	18.5
07XS-24Z12Z06- ** -3-C-A-00-0/00	24 x 12 x 5.88	360	0.5	44.5	19.1
07XS-11F23F06- ** -3-C-A-00-0/00	11.38 x 23.38 x 5.88	330	0.5	41.3	20.4
07XS-12Z24Z06- ** -3-C-A-00-0/00	12 x 24 x 5.88	360	0.5	44.5	20.8
07XS-23F23F06- ** -3-C-A-00-0/00	23.38 x 23.38 x 5.88	730	0.5	88.2	26.7
07XS-24Z24Z06- ** -3-C-A-00-0/00	24 x 24 x 5.88	780	0.5	92.2	27.1

Replace \*\* in model number with 00 for no gasket, 1D for 1 gasket downstream, 1U for one gasket upstream, or 1B for a gasket on both sides.

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# Absolute V-G

## Absolute VG



### Advantages

- Plastic frame, no metal parts, lightweight, easily disposed of with a crushable and incinerable frame
- Airflow capabilities up to 2400 cfm
- High filter surface area offers low pressure drop for energy savings and longer life

**Description:** High capacity HEPA/ULPA grade filter in an all-plastic enclosing frame with poured-in-place sealing gasket.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 95% to 99.99%.

**Media:** Microfine glass media formed into individual mini-pleat media packs and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters.

For more information see Literature ABS-VG.

Model Number	Efficiency	Nominal Dimensions (W x H x D inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq.ft.)	Shipping Weight (lbs.)
855013-215		24 x 12 x 12	900		174	15
855013-214	95% at 0.3 micron	24 x 24 x 12	2000	0.50	390	28
855013-213		24 x 24 x 12	2400		431	29
855013-212		24 x 12 x 12	900		174	15
855013-211	99.99% at 0.3 micron	24 x 24 x 12	2000	1.00	390	28
855013-210		24 x 24 x 12	2400		431	29

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# Filtra 2000 Absolute®



## Advantages

- High filter surface area offers low pressure drop for energy savings and longer life
- Airflow capabilities up to 2400 cfm with low initial pressure drop

**Description:** High capacity HEPA/ULPA grade filter in an anodized aluminum enclosing frame with seamless poured-in-place sealing gasket

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 95% to 99.999% at 0.3µ to

**Media:** Microfine glass media formed into individual mini-pleat media packs and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 175° F (79° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 1823 for more details.

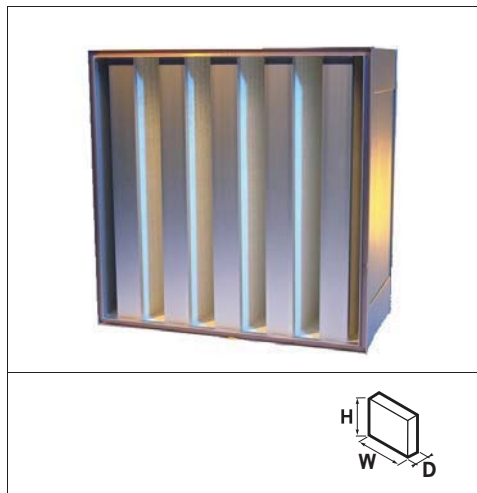
Model Number	Efficiency	Nominal Size (H x W x D, inches)	Airflow Capacity (cfm)	Resistance @ Airflow (inches w.g.)	Media Area (sq.ft.)	Shipping Weight (lbs.)
FA 1565-03-01	95% @ 0.3 micron	24 x 12 x 11.50	900	0.5	174	22
FA 1563-03-01	95% @ 0.3 micron	24 x 24 x 11.50	1500	0.5	237	26
FA 1561-03-01	95% @ 0.3 micron	24 x 24 x 11.50	2000	0.5	390	35
FA 1560-03-01	95% @ 0.3 micron	24 x 24 x 11.50	2400	0.5	431	40
FA 1565-01-01	99.99% @ 0.3 micron	24 x 12 x 11.50	900	1.0	174	22
FA 1563-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	1500	1.0	237	26
FA 1561-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	2000	1.0	390	35
FA 1560-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	2400	1.0	431	40
FA 1565-02-01	99.999% @ 0.3 micron	24 x 12 x 11.50	693	1.0	174	22
FA 1563-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1155	1.0	237	26
FA 1561-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1540	1.0	390	35
FA 1560-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1848	1.0	431	40

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# Filtra 2000 GEL Absolute®



## Advantages

- High filter surface area offers low pressure drop for energy savings and longer life
- Airflow capabilities up to 2300 cfm with a low initial pressure drop
- Gel seal to ensure leak free performance when mounted to knife-edge mounting system

**Description:** High capacity HEPA/ULPA grade filter in an anodized aluminum enclosing frame with gel seal track with elastic gel sealant. Versions available for standard industry mounting systems or specific to Camfil containment housings.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 95% to 99.999% at 0.3µ.

**Media:** Microfine glass media formed into individual mini-pleat media packs and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 1823Gel for more details.

Model Number	Efficiency	Nominal Size (H x W x D, inches)	Airflow Capacity (cfm)	Resistance @ Airflow (inches w.g.)	Media Area (sq. ft.)	Shipping Weight (lbs.)
FA1575-03-01	95% @ 0.3 micron	24 x 12 x 11.50	864	0.5	162	22
FA1573-03-01	95% @ 0.3 micron	24 x 24 x 11.50	1437	0.5	221	26
FA1571-03-01	95% @ 0.3 micron	24 x 24 x 11.50	1908	0.5	363	35
FA1570-03-01	95% @ 0.3 micron	24 x 24 x 11.50	2294	0.5	401	40
FA1575-01-01	99.99% @ 0.3 micron	24 x 12 x 11.50	864	1.0	162	22
FA1573-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	1437	1.0	221	26
FA1571-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	1908	1.0	363	35
FA1570-01-01	99.99% @ 0.3 micron	24 x 24 x 11.50	2294	1.0	401	40
FA1575-02-01	99.999% @ 0.3 micron	24 x 12 x 11.50	665	1.0	162	22
FA1573-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1106	1.0	221	26
FA1571-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1469	1.0	363	35
FA1570-02-01	99.999% @ 0.3 micron	24 x 24 x 11.50	1766	1.0	401	40
FA1575A-01-01-**	99.99% @ 0.3 micron	24 x 12 x 11.50	800	1.0	152	22
FA1573A-01-01-**	99.99% @ 0.3 micron	24 x 24 x 11.50	1350	1.0	210	26
FA1571A-01-01-**	99.99% @ 0.3 micron	24 x 24 x 11.50	1790	1.0	345	35
FA1570A-01-01-**	99.99% @ 0.3 micron	24 x 24 x 11.50	2150	1.0	380	40
FA1575A-02-01-**	99.999% @ 0.3 micron	24 x 12 x 11.50	620	1.0	152	22
FA1573A-02-01-**	99.999% @ 0.3 micron	24 x 24 x 11.50	1000	1.0	210	26
FA1571A-02-01-**	99.999% @ 0.3 micron	24 x 24 x 11.50	1380	1.0	345	35
FA1570A-02-01-**	99.999% @ 0.3 micron	24 x 24 x 11.50	1625	1.0	380	40

Replace \*\* in model number with 00f or no extraction clips or 09 to include extraction clips.

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## Sofilair Green



### Advantages

- No metal parts, easily disposed of with a crushable and incinerable frame
- High filter surface area offers low pressure drop for energy savings and longer life
- Airflow capabilities up to 2300 cfm with a low initial pressure drop
- Engineered for optimal performance with CamContain advanced biocontainment systems

**Description:** High capacity HEPA/ULPA grade filter in an all-plastic enclosing frame with gel seal track with elastic gel sealant.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** 95% to 99.999% at 0.3μ.

**Media:** Microfine glass media formed into individual mini-pleat media packs and assembled into a V-bank filter configuration.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters.

Contact factory for additional details.

Part #	Type (EN 1822 Efficiency)	Model	Dimensions (W x H x D inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq.ft.)	Shippin g Weight (lbs.)
15658102	H14	SFR-G-H14-305/610/292-1400	12 x 24 x 11.50	825	1.12	161	16
15608206	H14	SFR-G-H14-610/610/292-3500	24 x 24 x 11.50	2060	1.08	410	32
15658100	H13	SFR-G-H13-305/610/292-1500	12 x 24 x 11.50	882	1.00	161	16
15608200	H13	SFR-G-H13-610/610/292-4000	24 x 24 x 11.50	2354	1.00	410	32
15858100	E12	SFR-G-E12-305/610/292-1500	12 x 24 x 11.50	882	1.00	Consult Factory	27
15808200	E12	SFR-G-E12-610/610/292-4000	24 x 24 x 11.50	2354	1.00	410	36
15758200	E10	SFR-G-E10-305/610/292-2000	12 x 24 x 11.50	1177	0.92	140	16
15708100	E10	SFR-G-E10-610/610/292-5000	24 x 24 x 11.50	2942	0.92	355	32

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# K Absolute®



## Advantages

- High temperature Absolute for Class 100 oven validation to 500° F ( 260° C)
- Available in efficiencies of 95%, 99.97% or 99.99% at 0.3µ

**Description:** High temperature HEPA grade filter with corrugated aluminum separators, silicone sealant, and stainless steel enclosing frame.

**Typical applications:** High temperature ovens in pharmaceuticals and clean process manufacturing.

**Efficiency:** 95%, 99.97% and 99.99% at 0.3µ.

**Media:** Microfine glass media formed into full pleats separated by corrugated aluminum separators.

**Recommended final pressure drop:** Recommended final pressure drop is 2.0" w.g. Consult factory for more information.

**Temperature:** Maximum continuous operating temperature of 500° F (260° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 1813 for more details.

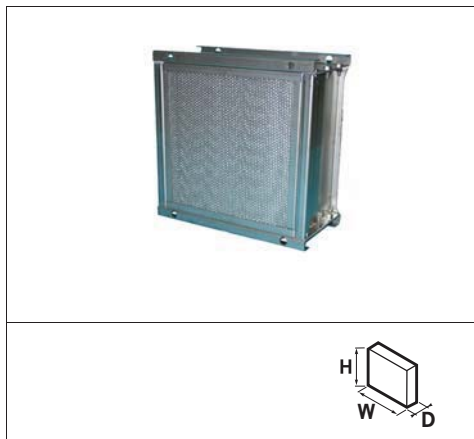
Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)	Shipping Weight (lbs.)
01KS-12Z12Z12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	12 x 12 x 11.50	210	1.0	41.0	20.0
01KS-23F11F12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 11.38 x 11.50	440	1.0	79.0	27.0
01KS-24Z12Z12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	24 x 12 x 11.50	480	1.0	88.0	28.0
01KS-11F23F12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	11.38 x 23.38 x 11.50	440	1.0	79.0	27.0
01KS-12Z24Z12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	12x 24 x 11.50	460	1.0	88.0	28.0
01KS-23F23F12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	23.38 x 23.38 x 11.50	980	1.0	174.5	41.0
01KS-24Z24Z12-2D-3-E-A-00-0/00	99.97% @ 0.3 µ	H	24 x 12 x 11.50	1040	1.0	186.0	42.0
12KS-23F11F12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 11.38 x 11.50	440	1.0	79.0	27.0
12KS-24Z12Z12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	24 x 24 x 11.50	480	1.0	88.0	28.0
12KS-11F23F12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	11.38 x 23.38 x 11.50	440	1.0	79.0	27.0
12KS-12Z24Z12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	12 x 24 x 11.50	460	1.0	88.0	28.0
12KS-23F23F12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	23.38 x 23.38 x 11.50	980	1.0	174.5	41.0
12KS-24Z24Z12-2D-3-E-A-00-0/00	99.99% @ 0.3 µ	J	24 x 24 x 11.50	1040	1.0	186.0	42.0
07KS-12Z12Z12-2D-3-E-A-00-0/00	95% @ 0.3 µ		12 x 12 x 11.50	190	0.50	43.8	20.0
07KS-23F11F12-2D-3-E-A-00-0/00	95% @ 0.3 µ		23.38 x 11.38 x 11.50	400	0.50	85.5	27.5
07KS-24Z12Z12-2D-3-E-A-00-0/00	95% @ 0.3 µ		24 x 12 x 11.50	440	0.50	94.5	28.5
07KS-11F23F12-2D-3-E-A-00-0/00	95% @ 0.3 µ		11.38 x 23.38 x 11.50	400	0.50	85.5	27.5
07KS-12Z24Z12-2D-3-E-A-00-0/00	95% @ 0.3 µ		12 x 24 x 11.50	440	0.50	94.5	28.5
07KS-23F23F12-2D-3-E-A-00-0/00	95% @ 0.3 µ		23.38 x 23.38 x 11.50	940	0.50	190.0	41.5
07KS-24Z24Z12-2D-3-E-A-00-0/00	95% @ 0.3 µ		24 x 24 x 11.50	1040	0.50	199.0	42.5

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# F Absolute®



## Advantages

- High temperature Absolute for Class 100 oven validation to 750° F ( 398° C)
- Available in efficiencies of 95% or 99.97% at 0.3µ

**Description:** High temperature HEPA grade filter with corrugated aluminum separators, ceramic sealant stainless steel enclosing frame and foil-wrapped fiberglass and/or ceramic gasket.

**Typical applications:** High temperature ovens in pharmaceuticals and clean process manufacturing.

**Efficiency:** 95% or 99.97% at 0.3µ.

**Media:** Microfine glass media formed into pleats separated by corrugated aluminum separators with hemmed edges.

**Recommended final pressure drop:** Recommended final pressure drop is 2.0" w.g., or consult factory.

**Temperature:** Maximum continuous operating temperature of 750° F (400° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 1812 for more details.

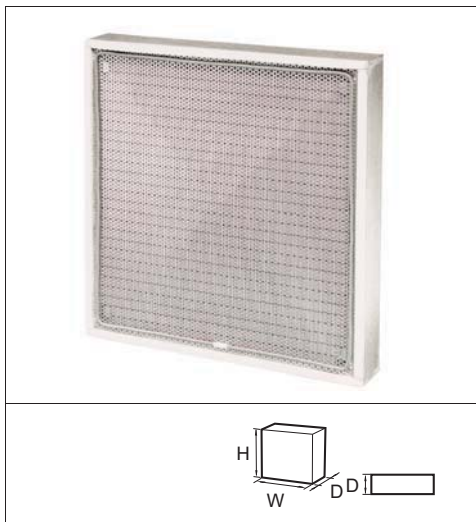
Model Number	Efficiency	IEST Type	Nominal Size (inches)	Airflow Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)	Shipping Weight (lbs.)
01FS-12Z12Z12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	12 x 12 x 11.50	210	1.0	41.0	20.0
01FS-23F11F12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	23.375 x 11.375 x 11.50	440	1.0	79.0	27.0
01FS-24Z12Z12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	24 x 12 x 11.50	480	1.0	88.0	28.0
01FS-11F23F12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	11.375 x 23.375 x 11.50	440	1.0	79.0	27.0
01FS-12Z24Z12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	12 x 24 x 11.50	460	1.0	88.0	28.0
01FS-23F23F12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	23.375 x 23.375 x 11.50	980	1.0	174.5	41.0
01FS-24Z24Z12-2D-3-E-A-2D-0/00	99.97% @ 0.3 Micron	A	24 x 24 x 11.50	1040	1.0	186.0	42.0
07FS-12Z12Z12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		12 x 12 x 11.50	190	0.50	43.8	20.0
07FS-23F11F12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		23.38 x 11.38 x 11.50	400	0.50	85.5	27.5
07FS-24Z12Z12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		24 x 12 x 11.50	440	0.50	94.5	28.5
07FS-11F23F12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		11.38 x 23.38 x 11.50	400	0.50	85.5	27.5
07FS-12Z24Z12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		12 x 24 x 11.50	440	0.50	94.5	28.5
07FS-23F23F12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		23.38 x 23.38 x 11.50	940	0.50	190.0	41.5
07F-24Z24Z12-2D-3-E-A-2D-0/00	95% @ 0.3 Micron		24 x 24 x 11.50	1040	0.50	199.0	42.5

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# Termikfil 2000 Absolute®



## Advantages

- Saves labor and manufacturing downtime with its shorter temperature rise cycle
- High temperature (650°) HEPA filter with unique floating component design
- The only HEPA filter that can comply with the most stringent FDA GMP requirements

**Description:** High temperature HEPA grade filter with filament thread media separators, ceramic sealant, and ceramic holding frame and glass-braid or rolled glass fiber sealing gasket.

**Typical applications:** High temperature ovens in pharmaceuticals and clean process manufacturing.

**Efficiency:** 99.99% at MPPS (most penetrating particle size).

**Media:** Microfine glass media separated by glass filament media separators.

**Recommended final pressure drop:** Consult factory. Recommended final pressure drop is 2.0" w.g.

**Temperature:** Maximum continuous operating temperature of 662° F (350° C).

**Ratings:** Tested in accordance with EN1822.

See Literature 1816 for more details.

Part Number	Model	Efficiency	Nominal Size (H x W x D inches)	Airflow Capacity @ 1.0" w.g.	Shipping Weight (lbs.)
855100350	3P6	99.9% @ MPPS	12 x 24 x 3.3	350	8.8
855100349	6P6	99.9% @ MPPS	24 x 24 x 3.3	700	11.0
855100255	7P6	99.9% @ MPPS	30 x 24 x 3.3	880	13.0
855100268	9P6	99.9% @ MPPS	36 x 24 x 3.3	1050	17.6
855100236	4P6	99.9% @ MPPS	18 x 24 x 3.3	530	9.0
855100249	3P3	99.9% @ MPPS	12 x 12 x 3.3	175	4.4
855100280	4P4	99.9% @ MPPS	18 x 18 x 3.3	400	6.6

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# E-PTFE Megalam®



## Advantages

- Low outgassing, chemically compatible ULPA filter
- Media has very high mechanical strength and is resistant to tearing and hostile environments

**Description:** Low outgassing, chemically compatible ULPA grade filter available with gasket, gel or knife-edge seal.

**Typical applications:** Hostile environments, chemical processing, pharmaceuticals and other clean process applications.

**Efficiency:** 99.99995% at most penetrating particle size (MPPS).

**Media:** Durable, chemically resistant, hydrophobic polytetrafluoroethylene media formed into a mini-pleat filter pack using exclusive Camfil Closepleat manufacturing technology.

**Recommended final pressure drop:** Consult factory. Rule of thumb: change filter when the initial pressure drop doubles.

**Temperature:** Maximum continuous operating temperature of 150° F (66° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing ULPA Filters. Rated by Underwriters Laboratories as UL 900.

See Literature 3219 for more details.

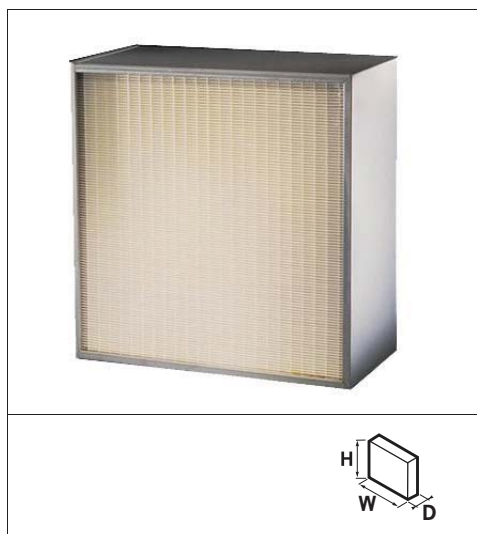
Model	Size (inches)	Efficiency @ MPPS	Pressure Drop @ 100 fpm (inches w.g.)	Shipping Weight (lbs.)
Frame Type: Gasket Seal (3.00" overall depth, 76 mm ) Pleat Depth 1.77" (45 mm)				
S2-12.00-24.00-1-03-00-00-00-0	12.00 x 24.00	99.99995%	0.48	12
S2-24.00-24.00-1-03-00-00-00-0	24.00 x 24.00	99.99995%	0.48	16
S2-24.00-36.00-1-03-00-00-00-0	24.00 x 36.00	99.99995%	0.48	23
S2-24.00-48.00-1-03-00-00-00-0	24.00 x 48.00	99.99995%	0.48	29
S2-24.00-60.00-1-03-00-00-10-0	24.00 x 60.00	99.99995%	0.48	38
S2-24.00-72.00-1-03-00-00-10-0	24.00 x 72.00	99.99995%	0.48	44
S2-30.00-36.00-1-03-00-00-00-0	30.00 x 36.00	99.99995%	0.48	27
S2-30.00-48.00-1-03-00-00-10-0	30.00 x 48.00	99.99995%	0.48	38
S2-30.00-60.00-1-03-00-00-10-0	30.00 x 60.00	99.99995%	0.48	45
S2-30.00-72.00-1-03-00-00-10-0	30.00 x 72.00	99.99995%	0.48	52
S2-36.00-36.00-1-03-00-00-10-0	36.00 x 36.00	99.99995%	0.48	35
S2-36.00-48.00-1-03-00-00-00-0	36.00 x 48.00	99.99995%	0.48	44
S2-36.00-60.00-1-03-00-00-00-0	36.00 x 60.00	99.99995%	0.48	52
Frame Type: Gasket Seal (3.54" overall depth, 90mm ) Pleat Depth 2.68" (68 mm)				
S2-12.00-24.00-2-14-00-00-00-0	12.00 x 24.00	99.99995%	0.37	12
S2-24.00-24.00-2-14-00-00-00-0	24.00 x 24.00	99.99995%	0.37	16
S2-24.00-36.00-2-14-00-00-00-0	24.00 x 36.00	99.99995%	0.37	23
S2-24.00-48.00-2-14-00-00-00-0	24.00 x 48.00	99.99995%	0.37	29
S2-24.00-60.00-2-14-00-00-30-0	24.00 x 60.00	99.99995%	0.37	38
S2-24.00-72.00-2-14-00-00-30-0	24.00 x 72.00	99.99995%	0.37	44
S2-30.00-36.00-2-14-00-00-00-0	30.00 x 36.00	99.99995%	0.37	27
S2-30.00-48.00-2-14-00-00-30-0	30.00 x 48.00	99.99995%	0.37	38
S2-30.00-60.00-2-14-00-00-30-0	30.00 x 60.00	99.99995%	0.37	45
S2-30.00-72.00-2-14-00-00-30-0	30.00 x 72.00	99.99995%	0.37	52
S2-36.00-36.00-2-14-00-00-30-0	36.00 x 36.00	99.99995%	0.37	35
S2-36.00-48.00-2-14-00-00-30-0	36.00 x 48.00	99.99995%	0.37	44
S2-36.00-60.00-2-14-00-00-30-0	36.00 x 60.00	99.99995%	0.37	52

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# Ultra-Pac® Absolute®



## Advantages

- Ideal for use in existing systems that require increased airflow
- Close-pleat technology increases filter media area providing a lower resistance to airflow resulting in energy savings

**Description:** MERV 16 or HEPA grade filter in a 16-gauge galvanized steel enclosing frame.

**Typical applications:** Built-up filter banks, rooftops, and air handlers in medical facilities, pharmaceuticals, and clean process manufacturing.

**Efficiency:** MERV 16 or 99.99% at 0.3µ.

**Media:** Mini-pleated microfine glass media in a 12" pack, sealed with fire-retardent polyurethane sealant.

**Recommended final pressure drop:** Rule of thumb: change filter when the initial pressure drop doubles, or consult factory.

**Temperature:** Maximum continuous operating temperature of 160° F (70° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filter.

See Literature 1824 for more details.

Model Number	Efficiency @ 0.3 Micron	Nominal Size (inches)	Airflow Capacity (cfm)	Resistance @ Capacity (inches w.g.)	Media Area (sq. ft.)	Shipping Weight (lbs.)
GGEM-200-**	95%	12 x 12 x 11.50	240	0.50	38	10
GGEM-450-**	95%	12 x 24 x 11.50	520	0.50	77	17
GGEM-725-**	95%	18 x 24 x 11.50	820	0.50	116	24
GGEM-1000-**	95%	24 x 24 x 11.50	1120	0.50	155	32
GGEM-1250-**	95%	30 x 24 x 11.50	1410	0.50	194	40
TREM-200-**	95%	12 x 12 x 11.50	300	0.50	57	12
TREM-450-**	95%	12 x 24 x 11.50	650	0.50	116	20
TREM-725-**	95%	18 x 24 x 11.50	1020	0.50	174	28
TREM-1000-**	95%	24 x 24 x 11.50	1400	0.50	233	34
TREM-1250-**	95%	30 x 24 x 11.50	1770	0.50	290	43
GGEA-200-**	99.99%	12 x 12 x 11.50	225	1.0	41	10
GGEA-450-**	99.99%	12 x 24 x 11.50	475	1.0	78	17
GGEA-725-**	99.99%	18 x 24 x 11.50	750	1.0	126	24
GGEA-1000-**	99.99%	24 x 24 x 11.50	1040	1.0	169	32
GGEA-1250-**	99.99%	30 x 24 x 11.50	1300	1.0	211	40
TREA-200-**	99.99%	12 x 12 x 11.50	340	1.0	61	12
TREA-450-**	99.99%	12 x 24 x 11.50	725	1.0	126	20
TREA-725-**	99.99%	18 x 24 x 11.50	1140	1.0	188	28
TREA-1000-**	99.99%	24 x 24 x 11.50	1560	1.0	253	34
TREA-1250-**	99.99%	30 x 24 x 11.50	1970	1.0	315	43

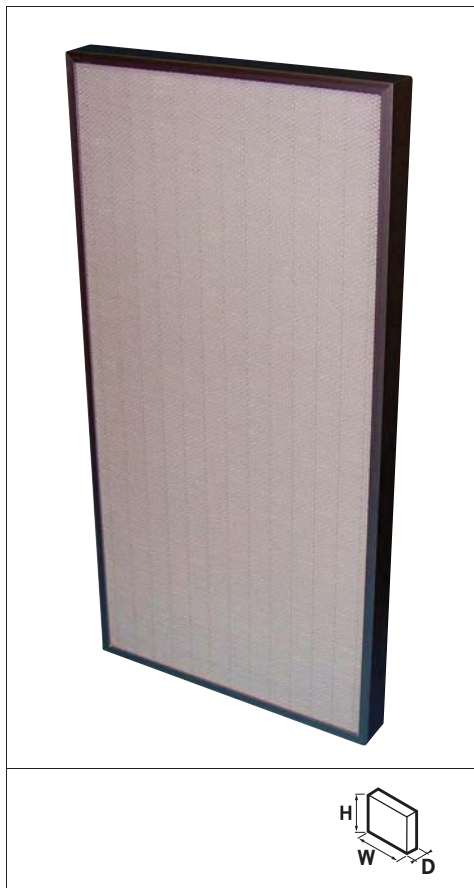
Replace \*\* in model number with None for no downstream gasket, 01 for downstream gasket, 10 for upstream gasket, or 11 for gaskets upstream and downstream.

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# Megalam® Mini-Pleat Panel Filters



## Advantages

- **Exclusive Controlled Media Spacing (CMS) ensures uniform airflow and even loading over the life of the filter**
- **Available as filter replacements for most cleanroom filters, housings and ceiling modules and grid systems**

**Description:** HEPA/ULPA mini-pleat panel filters for installation in cleanroom ceiling modules or filter housings. Available in 53mm, 70mm or 100mm pack depths.

Available with gasket, knife-edge or gel channel for sealing to mounting hardware.

**Typical applications:** Pharmaceutical and semiconductor manufacturing facilities, medical facilities and other clean process applications.

**Efficiency:** 95% at 0.3µ to 99.9995% at most penetrating particle size (MPPS).

**Media:** Microfine glass media, with continuous glass filament separators formed into a single mini-pleat filter pack.

**Temperature:** Maximum continuous operating temperature up to 200° F (93° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Product Sheet 3216 for more details.

Model Number	Actual Width (inches)	Actual Length (inches)	Actual Height (inches)	Initial Resistance (inches w.g.) @ 95% @ 0.3µ	Initial Resistance (inches w.g.) HEPA	Initial Resistance (inches w.g.) ULPA	Shipping Weight (lbs)
<b>53 mm Pack (2.08")</b>							
P * -12.00-24.00-4-03-00-00-00-0	12	24	3	0.21	0.49	0.68	8.8
P * -24.00-24.00-4-03-00-00-00-0	24	24	3	0.21	0.49	0.68	10.3
P * -24.00-36.00-4-03-00-00-00-0	24	36	3	0.21	0.49	0.68	13.8
P * -24.00-48.00-4-03-00-00-00-0	24	48	3	0.21	0.49	0.68	17
P * -24.00-60.00-4-03-00-00-10-0	24	60	3	0.21	0.49	0.68	22.6
P * -24.00-72.00-4-03-00-00-10-0	24	72	3	0.21	0.49	0.68	25.9
P * -30.00-36.00-4-03-00-00-00-0	30	36	3	0.21	0.49	0.68	15.8
P * -30.00-48.00-4-03-00-00-10-0	30	48	3	0.21	0.49	0.68	22.3
P * -30.00-60.00-4-03-00-00-10-0	30	60	3	0.21	0.49	0.68	26
P * -30.00-72.00-4-03-00-00-10-0	30	72	3	0.21	0.49	0.68	29
P * -36.00-36.00-4-03-00-00-10-0	36	36	3	0.21	0.49	0.68	21.3
P * -36.00-48.00-4-03-00-00-10-0	36	48	3	0.21	0.49	0.68	25.3
P * -36.00-60.00-4-03-00-00-10-0	36	60	3	0.21	0.49	0.68	29.5



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Filters

Model Number	Actual Width (inches)	Actual Length (inches)	Actual Height (inches)	Initial Resistance (inches w.g.) 95% @ 0.3µ	Initial Resistance (inches w.g.) HEPA	Initial Resistance (inches w.g.) ULPA	Shipping Weight (lbs)
P * -36.00-72.00-4-03-00-00-10-0	36	72	3	0.21	0.49	0.68	33.8
<b>70 mm Pack (2.75")</b>							
P * -12.00-24.00-8-14-00-00-00-0	12	24	3.54	0.17	0.38	0.48	10.3
P * -24.00-24.00-8-14-00-00-00-0	24	24	3.54	0.17	0.38	0.48	12
P * -24.00-36.00-8-14-00-00-00-0	24	36	3.54	0.17	0.38	0.48	16.3
P * -24.00-48.00-8-14-00-00-00-0	24	48	3.54	0.17	0.38	0.48	20.5
P * -24.00-60.00-8-14-00-00-30-0	24	60	3.54	0.17	0.38	0.48	26.8
P * -24.00-72.00-8-14-00-00-30-0	24	72	3.54	0.17	0.38	0.48	30.9
P * -30.00-36.00-8-14-00-00-30-0	30	36	3.54	0.17	0.38	0.48	18.8
P * -30.00-48.00-8-14-00-00-30-0	30	48	3.54	0.17	0.38	0.48	26.3
P * -30.00-60.00-8-14-00-00-30-0	30	60	3.54	0.17	0.38	0.48	31
P * -30.00-72.00-8-14-00-00-30-0	30	72	3.54	0.17	0.38	0.48	35.7
P * -36.00-36.00-8-14-00-00-30-0	36	36	3.54	0.17	0.38	0.48	24.7
P * -36.00-48.00-8-14-00-00-30-0	36	48	3.54	0.17	0.38	0.48	29.9
P * -36.00-60.00-8-14-00-00-30-0	36	60	3.54	0.17	0.38	0.48	35.3
P * -36.00-72.00-8-14-00-00-30-0	36	72	3.54	0.17	0.38	0.48	40.5
<b>100 mm Pack (3.94")</b>							
P * -12.00-24.00-B-17-00-00-00-0	12	24	4.83	0.14	0.29	0.36	16.5
P * -24.00-24.00-B-17-00-00-00-0	24	24	4.83	0.14	0.29	0.36	18.6
P * -24.00-36.00-B-17-00-00-00-0	24	36	4.83	0.14	0.29	0.36	25.9
P * -24.00-48.00-B-17-00-00-00-0	24	48	4.83	0.14	0.29	0.36	33
P * -24.00-60.00-B-17-00-00-60-0	24	60	4.83	0.14	0.29	0.36	43.3
P * -24.00-72.00-B-17-00-00-60-0	24	72	4.83	0.14	0.29	0.36	50.4
P * -30.00-36.00-B-17-00-00-00-0	30	36	4.83	0.14	0.29	0.36	30.4
P * -30.00-48.00-B-17-00-00-60-0	30	48	4.83	0.14	0.29	0.36	42.5
P * -30.00-60.00-B-17-00-00-60-0	30	60	4.83	0.14	0.29	0.36	50.9
P * -30.00-72.00-B-17-00-00-60-0	30	72	4.83	0.14	0.29	0.36	59.3
P * -36.00-36.00-B-17-00-00-60-0	36	36	4.83	0.14	0.29	0.36	39.4
P * -36.00-48.00-B-17-00-00-60-0	36	48	4.83	0.14	0.29	0.36	49
P * -36.00-60.00-B-17-00-00-60-0	36	60	4.83	0.14	0.29	0.36	58.5
P * -36.00-72.00-B-17-00-00-60-0	36	72	4.83	0.14	0.29	0.36	68

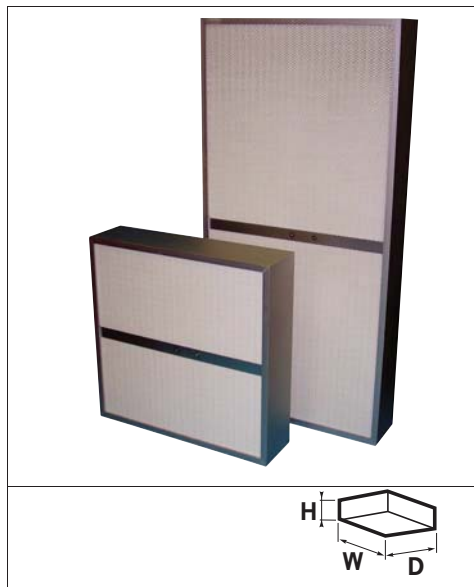
Replace \* with "4" for 95% @ 0.3 micron, "5" for 99.99% @ 0.3 micron.  
 For 53 mm replace \* with "7" for 99.9995% @ MPPS.  
 For 70 and 100 mm replace \* with "X" for 99.9995% @ MPPS.

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# Megalam<sup>®</sup> Terminal Diffuser



## Advantages

- Lightweight, compact ducted filter module for clean processes or medical suites
- Low pressure drop saves energy and low life-cycle cost reduces disposal costs

**Description:** Ducted ceiling module constructed of an anodized aluminum frame with a galvanized steel back plate. Designed for installation into T-bar ceiling grid systems. Also available with knife-edge for gel grid systems.

**Typical applications:** Pharmaceutical and semiconductor manufacturing facilities, medical facilities and other clean process applications.

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

See Literature 3217 for more details.

Model	Dimensions (inches, WxLxH)	Resistance @ 100 fpm (inches, w.g.)	Total CFM @ rated velocity	Weight (lbs)
70 MM pack depth, efficiency 95% @ 0.3 micron				
D4-23.62-23.62--8-13-00-1D-32-*	23.62 x 23.62 x 5.92		319	23.3
D4-23.62-41.62--8-13-00-1D-32-*	23.62 x 41.62 x 5.92	0.19	596	34.5
D4-23.62-47.62--8-13-00-1D-32-*	23.62 x 47.62 x 5.92		688	38.3
70 MM pack depth, efficiency 99.99% @ 0.3 micron				
D5-23.62-23.62--8-13-00-1D-32-*	23.62 x 23.62 x 5.92		319	23.3
D5-23.62-41.62--8-13-00-1D-32-*	23.62 x 41.62 x 5.92	0.40	596	34.5
D5-23.62-47.62--8-13-00-1D-32-*	23.62 x 47.62 x 5.92		688	38.3
70 MM pack depth, efficiency 99.995% @ MPPS				
DX-23.62-23.62--8-13-00-1D-32-*	23.62 x 23.62 x 5.92		319	23.3
DX-23.62-41.62--8-13-00-1D-32-*	23.62 x 41.62 x 5.92	0.50	596	34.5
DX-23.62-47.62--8-13-00-1D-32-*	23.62 x 47.62 x 5.92		688	38.3
100 MM pack depth, efficiency 95% @ 0.3 micron				
D4-23.62-23.62-B-33-00-1D-62-*	23.62 x 23.62 x 5.92		319	23.3
D5-23.62-41.62-B-33-00-1D-62-*	23.62 x 41.62 x 5.92	0.16	596	34.5
DX-23.62-47.62-B-33-00-1D-62-*	23.62 x 47.62 x 5.92		688	38.3
100 MM pack depth, efficiency 99.99% @ 0.3 micron				
D4-23.62-23.62-B-33-00-1D-62-*	23.62 x 23.62 x 5.92		319	23.3
D5-23.62-41.62-B-33-00-1D-62-*	23.62 x 41.62 x 5.92	0.31	596	34.5
DX-23.62-47.62-B-33-00-1D-62-*	23.62 x 47.62 x 5.92		688	38.3
100 MM pack depth, efficiency 99.995% @ MPPS				
D4-23.62-23.62-B-33-00-1D-62-*	23.62 x 23.62 x 5.92		319	23.3
D5-23.62-41.62-B-33-00-1D-62-*	23.62 x 41.62 x 5.92	0.38	596	34.5
DX-23.62-47.62-B-33-00-1D-62-*	23.62 x 47.62 x 5.92		688	38.3

Replace \* with P for 10" collar or Q for 12" collar, add 2" to height for collar.



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# Slimline DCM-FD



## Advantages

- **Lightweight, compact ducted filter module for clean processes or medical suites**
- **Low pressure drop saves energy and low life-cycle cost reduces disposal costs**

**Description:** Low profile ducted ceiling module constructed of an anodized aluminum frame and with a galvanized steel back plate. Designed for installation into a T-bar ceiling grid system. Also available with knife-edge frame for gel grid systems.

**Typical applications:** Pharmaceutical and semiconductor manufacturing facilities, medical facilities and other clean process applications. See Camfil Literature 3218 for more details.

## Article Table

Model	Width (inches)	Length (inches)	Height (inches)	Resistance @ 100 fpm (inches, w.g.)	Shipping Weight (lbs)
95% @ 0.3 micron					
D4-23.62-23.62-2-02-00-1D-00-*		23.62			21
D4-23.62-41.62-2-02-00-1D-00-*	23.62	41.62	4.73	0.20	32
D4-23.62-47.62-2-02-00-1D-00-*		47.62			34
HEPA, 99.99% @ 0.3 micron					
D5-23.62-23.62-2-02-00-1D-00-*		23.62			21
D5-23.62-41.62-2-02-00-1D-00-*	23.62	41.62	4.73	0.47	32
D5-23.62-47.62-2-02-00-1D-00-*		47.62			34
ULPA, 99.9995% @ MPPS					
D7-23.62-23.62-2-02-00-1D-00-*		23.62			21
D7-23.62-41.62-2-02-00-1D-00-*	23.62	41.62	4.73	0.67	32
D7-23.62-47.62-2-02-00-1D-00-*		47.62			34

Replace \* with 18 for 10" collar, or Y for 12" collar.  
 'H' or height dimension includes overall height of module. Add 2" for collar.  
 MPPS—Most Penetrating Particle Size

# Slimline RSR



## Advantages

- **Lightweight, compact ducted filter module for clean processes or medical suites**
- **Low pressure drop saves energy and low life-cycle cost reduces disposal cost**

**Description:** Low-profile ducted filter module for HEPA/ULPA filters. Available with bubble tight guillotine or radial bowtie damper.

**Typical applications:** Pharmaceutical and semiconductor manufacturing facilities, medical facilities and other clean process applications.

**Efficiency:** 95% at 0.3µ to 99.9995% at Most Penetrating Particle Size (MPPS).

**Media:** Microfine glass media, with continuous glass filament separators formed into a single mini-pleat filter pack.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C).

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

Consult Literature 3422 for detailed information.

Model	Dimensions (inches, W x L x H)	Collar Diameter (inches)	Shipping Weight (lbs)
<b>1.50" T-Bar</b>			
SL RSR 23.62-23.62-10	23.62 X 23.62 X 5.3	10	34
SL RSR 23.62-23.62-12	23.62 X 23.62 X 5.3	12	34
SL RSR 23.62-35.62-10	23.62 X 35.62 X 5.3	10	40
SL RSR 23.62-35.62-12	23.62 X 35.62 X 5.37	12	40
SL RSR 23.62-41.62-10	23.62 X 41.62 X 5.3	10	46
SL RSR 23.62-41.62-12	23.62 X 41.62 X 5.3	12	46
SL RSR 23.62-47.62-10	23.62 x 47.62 x 5.37	10	50
SL RSR 23.62-47.62-12	23.62 x 47.62 x 5.37	12	50
<b>2.0" T-Bar</b>			
SL RSR 23.12-23.12-10	23.62 X 23.62 X 5.3	10	34
SL RSR 23.12-23.12-12	23.62 X 23.62 X 5.3	12	34
SL RSR 23.12-35.12-10	23.62 X 35.62 X 5.3	10	40
SL RSR 23.12-35.12-1	23.62 X 35.62 X 5.37	12	40
SL RSR 23.12-41.12-10	23.62 X 41.62 X 5.3	10	46
SL RSR 23.12-41.12-12	23.62 X 41.62 X 5.3	12	46
SL RSR 23.12-47.12-10	23.62 x 47.62 x 5.37	10	50
SL RSR 23.12-47.12-12	23.62 x 47.62 x 5.37	12	50

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# Pharmaseal®



## Advantages

- Combines essential features for high level cleanroom air cleanliness in pharmaceutical and biotechnology facilities
- Controls and connections accessible from the room side
- Fully welded housing
- Quick filter change
- Capability to isolate the room during filter change
- Through the selection of many options, fully customizable

**Description:** Fully welded ducted filter module for HEPA or ULPA requirements. Available with bubble-tight, guillotine or radial blade bow tie damper for precise air volume control.

**Typical Applications:** Pharmaceutical and semiconductor manufacturing facilities, medical facilities and other clean process applications.

**Efficiency:** 95% at 0.3µ to 99.9995% at Most Penetrating Particle Size (MPPS).

**Media:** Microfine glass media, with continuous glass filament separators formed into a single mini-pleat filter pack.

**Temperature:** Maximum continuous operating temperature of 200° F (93° C)

**Ratings:** Tested in accordance with IEST Recommended Practice for Testing HEPA Filters. UL 900.

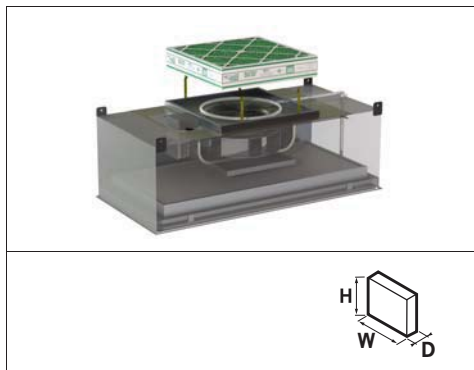
Please consult Literature 3420 for detailed information.

Consult factory or your authorized Camfil Representative for hood selection procedure.

Camfil Pharmaseal Filters provide fine particulate control to meet the requirements of today's high technology cleanrooms and clean areas. Offering configuration and performance flexibility, the Pharmaseal filter will provide the highest level of protection for product processes and personnel. Standard gel seal filters contain polyurethane gel for knife edge seal. Silicone gel is recommended when a high degree of cleaning and sterilization agents are used or in a high temperature application. Consult Camfil Pharmaseal Literature 3420 for filter selection.

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# Pharmaseal<sup>®</sup> Fan Filter Unit (FFU)



## Advantages

- The most advanced fan, motor and control technology available in an FFU
- Uniform air distribution
- Lower energy consumption for lower operating costs

**Description:** Fan filter unit for use in cleanroom applications.

**Typical applications:** Pharmaceutical manufacturing facilities, medical facilities and other clean process applications.

**Filtration:** 99.995% at MPPS, plus an optional Camfil 30/30<sup>®</sup> prefilter if desired.

See Pharmaseal FFU literature for additional details.

Size	Airflow	Resistance (inches, w.g.)	Power (watts)	dBA	Length (inches)	Width (inches)	Height (inches)	Weight (lbs)
Pharmaseal FFU with 53MM Megalam Filter Class ISO 45 E (99.995 at MPPS) at 100 fpm								
2 x 2	217	0.54	57	45	22.63	22.63	18	67
2 x 4	538		78	45	22.63	46.63		90
4 x 4	1163		139	47	46.63	46.63		155
Pharmaseal FFU with 100MM Megalam Filter Class ISO 45 E (99.995 at MPPS) at 100 fpm								
2 x 2	217	0.38	34	43	22.63	22.63	18	70
2 x 4	538		62	42	22.63	46.63		95
4 x 4	1163		105	45	46.63	46.63		165

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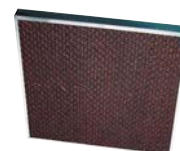
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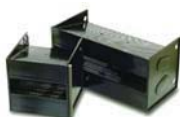
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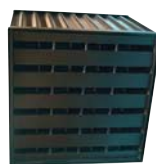
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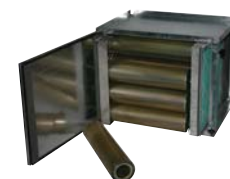
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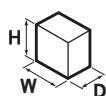
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# City-Flo



## Advantages

- **MERV 13 particle capture efficiency and odor control in one extended surface pocket filter**
- **Excellent for office buildings, retail stores, industrial facilities, medical facilities, shopping centers and schools**

**Description:** Multi-pocket high efficiency filters with tapered pleats and pocket stitching for the removal of particulates and gaseous contaminants.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 13 per ASHRAE Standard 52.2 and 92% initial removal efficiency on ozone.

**Media:** Air laid lofted microfine glass media with Rapid Adsorption Dynamics carbon embedded within the media.

**Recommended final pressure drop:** 1.0" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 122° F (50° C).

See Literature 2119 for more details.

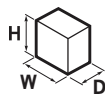
Model Number	Actual Size (H x W x D inches)	Capacity (cfm)	Initial Resistance (inches w.g.)	MERV	Shipping Weight (lbs.)
HFZS-242421-10-85	23.31 x 23.31 x 21.04	2000	0.56	13	13.2
HFZS-241221-5-85	23.31 x 11.30 x 21.04	1000	0.58	13	7.7

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# CityCarb



## Advantages

- **MERV 15 particle capture performance and odor control in one supported media filter**
- **Improves indoor air quality and reduces energy costs**

**Description:** Mini-pleated V-cell air filter for the removal of particulates and gaseous contaminants.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** MERV 15 per ASHRAE Standard 52.2 and 95% initial removal efficiency on ozone.

**Media:** Synthetic filter media with Rapid Adsorption Dynamics carbon embedded within the media.

**Recommended final pressure drop:** 1.8" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 104° F (40° C).

See Literature 2120 for more details.

Model Number	Actual Size (H x W x D inches)	Capacity (cfm)	Initial Resistance (inches w.g.)	Media Area (sq. ft.)	MERV	Shipping Weight (lbs)
For Standard HVAC Applications						
OPKCC-242412/21 85-0	23.38 x 23.38 x 11.50	2000		86.1		24
OPKCC-242012/21 85-0	23.38 x 19.38 x 11.50	1650	0.48	71.0	15	21
OPKCC-241212/21 85-0	23.38 x 11.38 x 11.50	1000		37.7		12
For Acid Gas Applications						
OPKCC-242412/21 85-ACID-0	23.38 x 23.38 x 11.50	2000		86.1		24
OPKCC-242012/21 85-ACID-0	23.38 x 19.38 x 11.50	1650	0.48	71.0	15	21
OPKCC-241212/21 85-ACID-0	23.38 x 11.38 x 11.50	1000		37.7		12

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## CamSorb® CH Loose-Fill V-Cell Cartridge Filter



### Advantages

- Recommended for reduction of modest occupancy odor loads and peak-shaving of ambient air pollutants
- Reduce outside air per *Indoor Air Quality Method as prescribed in ASHRAE Standard 62.1, Ventilation Standard for Acceptable Indoor Air Quality*

**Description:** V-style cartridge filter with panels of activated carbon for the removal of odors and peak-shaving of ambient air contaminants.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** 60% initial removal efficiency when tested using toluene.

**Media:** Coconut shell activated carbon. Other adsorbents available, contact factory.

**Recommended changeout period:** 1 year

**Temperature:** Maximum continuous operating temperature of 100° F (38° C) and 75% RH.

See Literature 2113 for more details and model number codes.

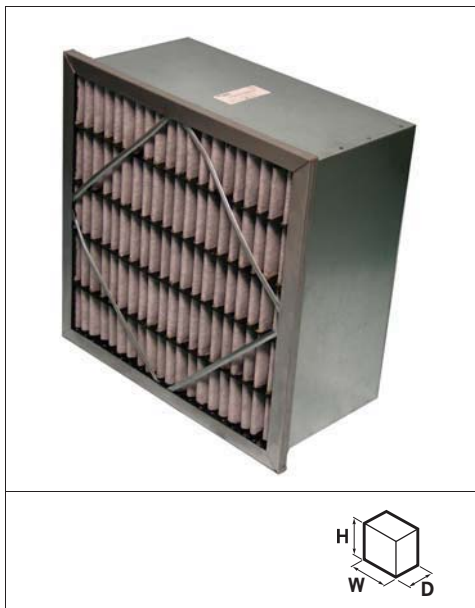
Sorbent	Description	Typical applications
CFS-201	Coconut shell activated carbon	New construction odors, VOCs, tobacco, ozone
CFS-202	Impregnated carbon for corrosive & acid gases	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing
CFS-101/CamPure 4	Activated alumina impregnated with 4% potassium permanganate	Indoor air quality, low molecular weight hydrocarbons
CFS-002	Blended carbon & CamPure 4	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, make-up air
CFS-103/CamPure 6XL	Activated alumina impregnated with 6% potassium permanganate and other proprietary impregnations	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing and acidic sulfur gases
CFS-004	Blended carbon & CamPure 6XL	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, make-up air

Nominal Size (inches)	Actual Size (H x D x W, inches)	Bed Thickness (inches)	Airflow Capacity (cfm)	Resistance @ Capacity (inches w.g.)
24 x 24 x 12	23.38 x 23.38 x 11.50	1	2000	0.38
24 x 20 x 12	23.38 x 19.38 x 11.50	1	1667	0.38
24 x 12 x 12	23.38 x 11.38 x 11.50	1	1000	0.38



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## CamSorb® Riga-Carb



## Advantages

- High capacity, low pressure drop air filter for the removal of low concentration odors and diesel emissions
- Reduce outside air per Indoor Air Quality Method as prescribed in ASHRAE Standard 62.1, Ventilation Standard for Acceptable Indoor Air Quality

**Description:** Supported deep-pleated adsorbent media box style air filter.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** Minimum toluene efficiency of of 95% at 500 fpm, 73° F, 50% RH, 80 ppm toluene.

**Media:** Camfil Rapid Adsorption Dynamics (RAD) carbon.

**Recommended final pressure drop:** 1.5" w.g. when operated at 500 fpm. System design may dictate alternative changeout point.

**Temperature:** Maximum continuous operating temperature of 104° F (40° C).

See Literature 2110 for more details.

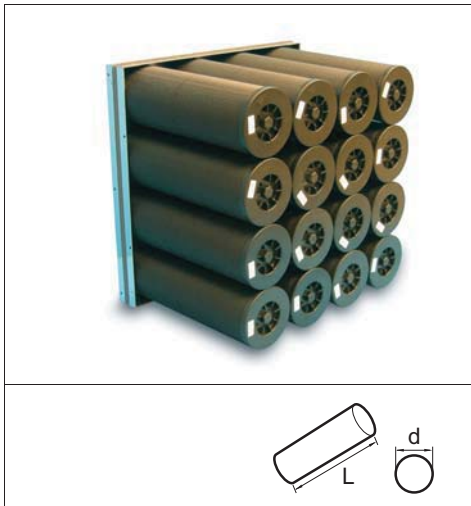
Model Number	Actual Size (H x W x D, inches)	Initial Resistance (inches w.g.)	Rated Airflow (cfm)	Weight (lbs.)
Activated Carbon for Standard HVAC Application				
CSRC-201-242412-PH	23-5/16 x 23-5/16 x11-7/16	0.25	2000	34
CSRC-201-241212-PH	23-5/16 x 11-5/16 x11-7/16		1000	20
CSRC-201-242412	23-5/16 x 23-5/16 x11-7/16		2000	36
CSRC-201-241212	23-5/16 x 11-5/16 x11-7/16		1000	21
Impregnated Carbon for Power Plants, Sewerage Odors, Fuel Combustion				
CSRC-202-242412-PH	23-5/16 x 23-5/16 x11-7/16	0.25	2000	34
CSRC-202-241212-PH	23-5/16 x 11-5/16 x11-7/16		1000	20
CSRC-202-242412	23-5/16 x 23-5/16 x11-7/16		2000	36
CSRC-202-241212	23-5/16 x 11-5/16 x11-7/16		1000	21
Impregnated Carbon for Diesel & Traffic Odors				
CSRC-205-242412-PH	23-5/16 x 23-5/16 x11-7/16	0.25	2000	34
CSRC-205-241212-PH	23-5/16 x 11-5/16 x11-7/16		1000	20
CSRC-205-242412	23-5/16 x 23-5/16 x11-7/16		2000	36
CSRC-205-241212	23-5/16 x 11-5/16 x11-7/16		1000	21

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## CamCarb Cylinders



### Advantages

- The lowest bypass, highest capacity design of any loose fill media HVAC adsorbent system
- High removal efficiency for high loading applications and long service life
- Reduce outside air per Indoor Air Quality Method as prescribed in ASHRAE Standard 62.1, Ventilation Standard for Acceptable Indoor Air Quality

**Description:** 1" deep adsorbent bed in a unique low bypass cylinder design with bayonet mounts and gasket seals. Available in disposable plastic or factory-refillable stainless steel. 16 cylinders per 2000 cfm. Excellent noise attenuation comparable to silencers and sound dampers.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers in airports, hospitals, museums, critical commercial and light industrial applications.

**Efficiency:** Minimum of 95% initial removal efficiency at rated airflow.

**Media:** Minimum of 1.5 pounds of adsorbent per 6" of cylinder length filled with activated carbon, oxidizers or blends specific to contaminant of concern.

**Temperature:** Maximum continuous operating temperature of 105° F (41° C) for plastic and 140° F (60° C) for stainless steel.

See Literature 2112 for more details.

Sorbent*	Description	Typical Applications
CFS-201	Activated carbon	New construction odors, VOCs, tobacco, ozone
CFS-202	Impregnated carbon for corrosive & acid gases	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing
CFS-101/CamPure 4	Activated alumina impregnated with 4% potassium permanganate	Indoor air quality, low molecular weight hydrocarbons, oxidizable acid gases
CFS-002	Blended carbon & CamPure 4	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air
CFS-103/CamPure 6XL	Activated alumina impregnated with 6% potassium permanganate and other proprietary impregnations	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing and acidic sulphur gases
CFS-004	Blended carbon & CamPure 6XL	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air

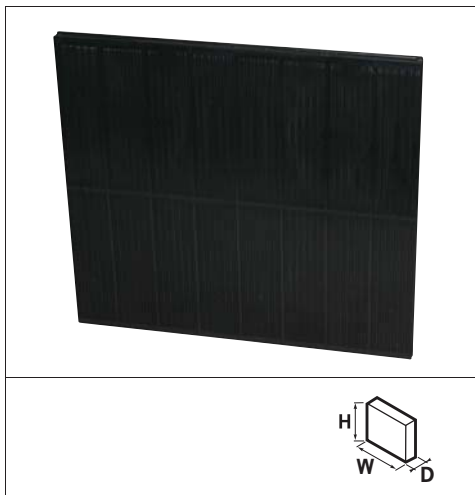
\* Other sorbents available, consult factory.

Cylinder Model	Diameter & Length (inches)	Bed Depth (inches)	Resistance (inches w.g.) w/16 cylinders per 2000 cfm	Sorbent Volume (cu. ft.)	Typical Carbon Mass (lbs.)	Typical Mass per 24" by 24" opening (2000 cfm)
CP26 (plastic)	5.7 x 18	1	0.63	0.15	4.5	72
CP35 (plastic)	5.7 x 24	1	0.59	0.20	6.0	96
CS26 (Stainless Steel)	5.7 x 18	1	0.63	0.15	4.5	72
CS35 (Stainless Steel)	5.7 x 24	1	0.59	0.20	6.0	96



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## CamSorb® 1" CF Panel



### Advantages

- High capacity, rechargeable carbon panels for the removal of gaseous contaminants
- 12 panels required per 2000 cfm or 42 fpm panel face velocity

**Description:** 1" deep loose-fill polystyrene or stainless steel panels for HVAC adsorbent. (22" by 24" by 1") Designed for use with CamSorb CF4A modules or CamSorb 3CF Glide/Pack housings.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** 80-85% toluene removal efficiency on toluene when used with activated carbon.

**Media:** Activated carbon, oxidizers or blends specific to contaminant of concern.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

See Literature 2101 for more details.

Sorbent*	Description	Typical Applications
CFS-201	Activated carbon	New construction odors, VOCs, tobacco, ozone
CFS-202	Impregnated carbon for corrosive & acid gases	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing
CFS-101/CamPure 4	Activated alumina impregnated with 4% potassium permanganate	Indoor air quality, low molecular weight hydrocarbons, oxidizable acid gases
CFS-002	Blended carbon & CamPure 4	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air
CFS-103/CamPure 6XL	Activated alumina impregnated with 6% potassium permanganate and other proprietary impregnations	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing and acidic sulphur gases
CFS-004	Blended carbon & CamPure 6XL	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air

\* Other sorbents available, consult factory.

## CamSorb® RS25D 2" Panel



### Advantages

- 2-inch loose-fill bypass panel for ozone removal

**Description:** 2" deep metal framed panel with replaceable inserts filled with activated carbon.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** Ozone removal efficiency of 25%

**Media:** Total of 8.5 pounds of coconut shell activated 4x6 mesh carbon per panel.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

See Literature 2105 for more details.

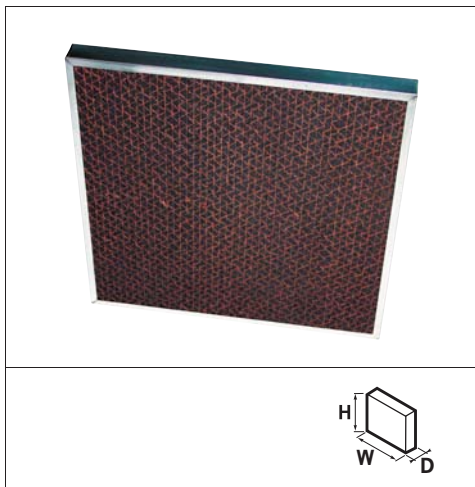
Available in 24" by 24" by 2" size only.

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## CamSorb® RS80 Panels



## Advantages

- Reduce outside air per Indoor Air Quality Method as prescribed in ASHRAE Standard 62.1, *Ventilation Standard for Acceptable Indoor Air Quality*
- Available in refillable (RS-80R) or disposable (RS-80D) models
- CamSorb RS80 2-inch loose-fill panels for moderate odor control or ozone removal

**Description:** 2" deep activated carbon panel filter in either a refillable model for lower disposal implications or a completely disposable model for convenience.

**Typical applications:** Built-up filter banks, rooftops, split systems, free-standing units, package systems and air handlers.

**Efficiency:** Minimum 60% ozone removal efficiency.

**Media:** 12 pounds of coconut shell carbon per panel. Other media available, consult factory.

**Temperature:** Maximum continuous operating temperature of 155° F (68° C).

See Literature 2103 for more details.

Available in 24" by 24" by 2" size only.

Sorbent*	Description	Typical applications
CFS-201	Coconut shell activated carbon	New construction odors, VOCs, tobacco, ozone
CFS-202	Impregnated carbon for corrosive & acid gases	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing
CFS-101	Activated alumina impregnated with potassium permanganate	Indoor air quality, low molecular weight hydrocarbons
CFS-002	Blended carbon & alumina impregnated with potassium permanganate	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, make-up air

\* Other sorbents available, consult factory.

## CamPure® GDM300



## Advantages

- Exact replacement for existing industrial exhaust systems
- Various medias available dependent upon the contaminant(s) of concern

**Description:** Industrial level disposable plastic adsorber module designed to remove corrosive gases from make-up air in industrial environments.

**Typical applications:** Existing side-access housings or built-up bank assemblies.

**Efficiency:** Media selection dependent, consult factory.

**Media:** Common Camfil media types include CFS-201, CFS-202, CFS-101/CamPure 4, CFS-002, CFS-103/CamPure 6XL or CFS-004.

**Temperature:** Maximum continuous operating temperature of 122° F (50° C).

See Literature 2109 300 for more details.

## Application Parameters Limitations

Relative humidity	30 - 90%
Temperature	122° F (50° C)
Residence time	minimum 0.25 seconds, make-up air, 0.6 seconds recirculated air
Normal airflow	125 feet per minute (250 cfm per module)
Pressure drop	0.30" w.g. (with CamPure media)

Contact Time	Air Volume GDM-300-F (cfm)	Air Volume GDM-300-H (cfm)
0.6	95	48
0.3	190	95
0.2	286	143
0.15	381	190
0.12	476	238
0.1	572	286
0.09	667	333
0.08	763	381
0.07	858	429
0.06	953	476

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## CamPure® GDM440



## Advantages

- Exact replacement for existing commercial odor control systems
- Various medias available dependent upon the contaminant(s) of concern

**Description:** Commercial level disposable plastic adsorber module designed to remove corrosive gases from make-up air in commercial environments.

**Typical applications:** Existing side-access housings or built-up bank assemblies.

**Efficiency:** Media selection dependent, consult factory.

**Media:** Common Camfil media types include CFS-201, CFS-202, CFS-101/CamPure 4, CFS-002, CFS-103/CamPure 6XL or CFS-004.

**Temperature:** Maximum continuous operating temperature of 122° F (50° C).

See Literature 2109 400 for more details.

## Application Parameters Limitations

Relative humidity	30 - 90%
Temperature	122° F (50° C)
Residence time	minimum 0.09 seconds, return air handling unit
Normal airflow	425 feet per minute (400 cfm per module)
Pressure drop	0.20" w.g. (with CamPure media)

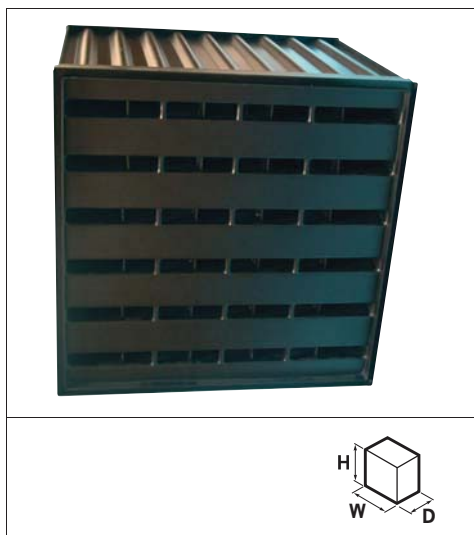
GDM-440-F	GDM-440-H
24" Wide	12" Wide
5.7" High	5.7" High
17.3" Long	17.3" Long
1" Bed depth	1" Bed depth
Media volume 0.47 cu. ft.	Media volume 0.24 cu. ft.

Sorbent*	Description	Typical Applications
CFS-201	Activated carbon	New construction odors, VOCs, tobacco, ozone
CFS-202	Impregnated carbon for corrosive & acid gases	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing
CFS-101/CamPure 4	Activated alumina impregnated with 4% potassium permanganate	Indoor air quality, low molecular weight hydrocarbons, oxidizable acid gases
CFS-002	Blended carbon & CamPure 4	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air
CFS-103/CamPure 6XL	Activated alumina impregnated with 6% potassium permanganate and other proprietary impregnations	Pulp & paper, sewage treatment facilities, manufacturing & chemical processing and acidic sulphur gases
CFS-004	Blended carbon & CamPure 6XL	Airports, pharmaceutical make-up air, funeral & nursing homes, animal care facilities, commercial building make-up air

\* Other sorbents available, consult factory.



## HEGA Filter Module



## Advantages

- High impact plastic construction to ensure rigidity and adsorbent retention
- For application in radiological laboratories, research facilities, chemical warfare applications and medical facilities

**Description:** Plastic framed high efficiency gas adsorbers for containment level housings or systems.

**Typical applications:** Camfil or other containment level housings or systems.

**Efficiency:** Consult factory for efficiency on contaminant(s) of concern.

**Media:** Various types of activated carbon, oxidants or other adsorbents. Consult factory.

**Temperature:** Maximum continuous operating temperature of 120° F (49° C).

See Literature 3431 for more details.

Model Number	Media Type	Height (inches)	Width (inches)	Depth (inches)	Rated Airflow (cfm)	Residence Time (seconds)	Approx. Resistance (inches w.g.)*	Number of Beds	Bed Depth (inches)	Approx. Weight (lbs.)
CF-F-241212-101-AP	A	24	12	12.25	500	0.083	1.00	10	1	44
CF-F-242412-101-AP	A	24	24	12.25	1000	0.083	1.00	10	1	83
CF-F-242416-62-AP	A	24	24	16.75	1000	0.143	1.35	6	2	115
CF-F-242416-121-AP	A	24	24	16.75	1250	0.115	0.75	12	1	133
CF-F-242418-62-AP	A	24	24	18.75	1250	0.129	1.70	6	2	128
CF-F-242419-121-AP	A	24	24	19.75	1500	0.115	0.95	12	1	150
CF-F-241212-101-NP	N	24	12	12.25	500	0.083	1.00	10	1	45
CF-F-242412-101-NP	N	24	24	12.25	1000	0.083	1.00	10	1	85
CF-F-242416-62-NP	N	24	24	16.75	1000	0.143	1.35	6	2	119
CF-F-242416-121-NP	N	24	24	16.75	1250	0.115	0.75	12	1	136
CF-F-242418-62-NP	N	24	24	18.75	1250	0.129	1.70	6	2	132
CF-F-242419-121-NP	T	24	24	19.75	1500	0.115	0.95	12	1	158
CF-F-241212-101-TP	T	24	12	12.25	500	0.083	2.00	10	1	50
CF-F-242412-101-TP	T	24	24	12.25	1000	0.083	2.00	10	1	94
CF-F-242416-62-TP	T	24	24	16.75	1000	0.143	3.10	6	2	134
CF-F-242416-121-TP	T	24	24	16.75	1250	0.115	1.40	12	1	150
CF-F-242418-62-TP	T	24	24	18.75	1250	0.129	3.70	6	2	143
CF-F-242419-121-TP	T	24	24	19.75	1500	0.115	1.65	12	1	171
CF-G-241212-101-AP	A	24	12	11.50	500	0.083	1.00	10	1	42
CF-G-242412-101-AP	A	24	24	11.50	1000	0.083	1.00	10	1	81
CF-G-242416-62-AP	A	24	24	16.00	1000	0.143	1.35	6	2	114
CF-G-242416-121-AP	A	24	24	16.00	1250	0.115	0.75	12	1	131
CF-G-242418-62-AP	A	24	24	18.00	1250	0.129	1.70	6	2	126
CF-G-242419-121-AP	A	24	24	19.00	1500	0.115	0.95	12	1	148
CF-G-241212-101-NP	N	24	12	11.50	500	0.083	1.00	10	1	43
CF-G-242412-101-NP	N	24	24	11.50	1000	0.083	1.00	10	1	83
CF-G-242416-62-NP	N	24	24	16.00	1000	0.143	1.35	6	2	117
CF-G-242416-121-NP	N	24	24	16.00	1250	0.115	0.75	12	1	134
CF-G-242418-62-NP	N	24	24	18.00	1250	0.129	1.70	6	2	130
CF-G-242419-121-NP	N	24	24	19.00	1500	0.115	0.95	12	1	156
CF-G-241212-101-TP	T	24	12	11.50	500	0.083	2.00	10	1	48
CF-G-242412-101-TP	T	24	24	11.50	1000	0.083	2.00	10	1	92
CF-G-242416-62-TP	T	24	24	16.00	1000	0.143	3.10	6	2	132
CF-G-242416-121-TP	T	24	24	16.00	1250	0.115	1.40	12	1	148
CF-G-242418-62-TP	T	24	24	18.00	1250	0.129	3.70	6	2	141
CF-G-242419-121-TP	T	24	24	19.00	1500	0.115	1.65	12	1	169

\* Resistance may vary by ± 20%.



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## CamCarb Green



## Advantages

- Completely incinerable
- Low pressure drop
- Reduced weight
- Conical inlet
- Two integral moulded TPE gaskets
- Rapid bayonet fitting system
- Corrosion resistant
- High performance

**Application:** Adsorption of odours, VOC's and / or low toxicity gases for airports, museums, kitchens, hospitals or clean room industry.

**Type:** Cylindrical activated carbon cartridge in ABS and HDPE.

**Temperature:** 40°C maximum in continuous service.

**Mounting System:** CamCarb mounting frame, FC-CC housings.

**Cylinders:** ABS plastic.

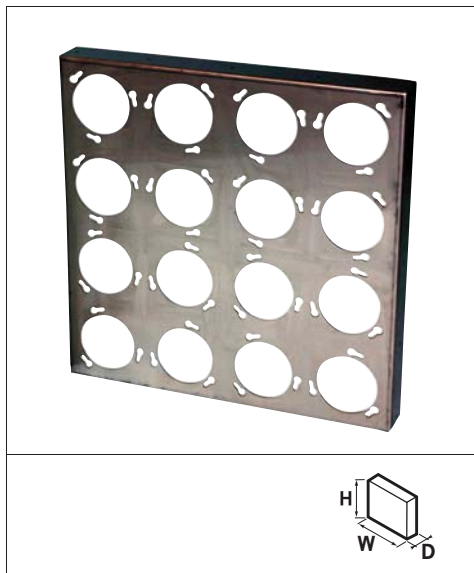
**Carbon:** "Broad Spectrum" activated carbon, adsorption of odours, ozone and organic gases, impregnated activated carbon, adsorption of non-organic gases.

**Media:** Carbon CEX003.

Model	Dimensions (WxHxD) mm	Carbon thickness mm	Carbon weight kg	Carbon type	*Airflow/pressure drop m <sup>3</sup> /h/Pa	Unitweight kg	Unitvolume m <sup>3</sup>
Cylinder 2600	147x93x450	26	2,3	CEX003	80/30	2,7	0,007
Cylinder3500	147x93x600	26	3,1	CEX003	100/30	3,7	

\* Based on a contact time of 0.2 sec. Alternative models are also available.

## CamCarb Cylinder Holding Frame



### Advantages

- Zero bypass frame combines high-capacity sorbent cylinders with built-up banks for large system gaseous contaminant control
- Sorbent media capacity of up to 96 pounds per 2000 cfm

**Typical applications:** Built-up banks in commercial or industrial HVAC systems. May be stacked to six high by any width dimension. Consult factory for reinforcement design guidance.

**Construction:** 14-gauge aluminized steel with sorbent cylinder air paths and mounting perforations.

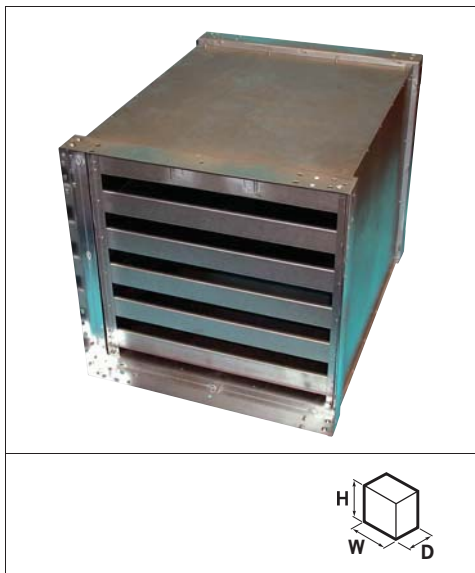
**Filters:** Camfil CamCarb cylinders of plastic or stainless steel construction.

**Additional data:** Sorbent residence time may be increased by reducing system velocity below standard velocity of 500 fpm per full size holding frame.

See Literature 2118 for more details.

Model Number	Frame Material	Actual Frame Depth (inches)	Actual Dimensions (H x W inches)	Cylinders Required	Rated Airflow (cfm)	Resistance 18" deep (inches w.g.)	Resistance 24" deep (inches w.g.)
G16GF2424	Aluminized	2.75	24 x 24	16	2000	0.63	0.59
G08GF2412	Aluminized	2.75	24 x 12	8	1000	0.63	0.59
G16SF2424	Stainless Steel	2.75	24 x 24	16	2000	0.63	0.59
G08SF2412	Stainless Steel	27.5	24 x 12	8	1000	0.63	0.59

## CamSorb<sup>®</sup> CF4A Modular Assemblies



### Advantages

- High-capacity gaseous contaminant control in a modular built-up bank assembly
- Up to 85 pounds of activated carbon per 2000 cfm using 12 CamSorb CF 1" polystyrene panels at 0.35" w.g.

**Typical applications:** Built-up filter banks in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge adsorber module with tracks for 12 polystyrene or optional metal trays between two universal holding frames that may incorporate particulate prefilters and final filters.

**Filters:** Universal frames accept filters from 1" in depth to 12" in depth in efficiencies of MERV 6 thru MERV 16 through the use of selected fasteners.

**Additional data:** May be stacked up to six modules high by any number of modules wide. Panels ordered separately.

See Literature 2106 for more details.

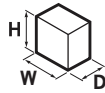
Available in 24" by 24" or 12" by 24" dimensions.

### Dimensions and Airflow Capacity (cfm)

	Full Size (H x W x D) 24" x 24" x 32"	Half Size (H x W x D) 12" x 24" x 32"
Height (with panels horizontal)	24"	12"
Rated Airflow	2000 cfm	1000 cfm
Number of Adsorber Panels	12	6
Net Volume of Sorbent Media	3.0 cubic feet	1.5 cubic feet
Approximate Weight of Complete Unit (w/carbon)	190 lbs (85 lbs. of carbon)	145 lbs (42 lbs. of carbon)

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

# CamSorb® RS Retainer/Pack Modular Assemblies



## Advantages

- Holds four CamSorb RS80 2" panels; 48 pounds of adsorbent per 2000 cfm with a low initial pressure drop of only 0.32" w.g.
- Excellent for areas of air quality non-attainment or reducing outside air per the IAQ Method as prescribed in ASHRAE Standard 62.1, Ventilation Standard for Acceptable Indoor Air Quality

**Typical applications:** Built-up filter banks in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge adsorbent module with tracks for 4 rechargeable or disposable CamSorb RS80 2" panels with a universal holding frame that may incorporate a particulate final filter and a prefilter mounting track that may be accessed from the upstream side of the module.

**Filters:** Accepts 1" deep prefilters, 4" to 12" final filters and 4 rechargeable or disposable CamSorb RS80 2" panels.

**Additional data:** May be stacked up to four modules high by any number of modules wide. Panels and particulate filters ordered separately.

See Literature 2102 for more details.

## Dimensions and Airflow Capacity (cfm)

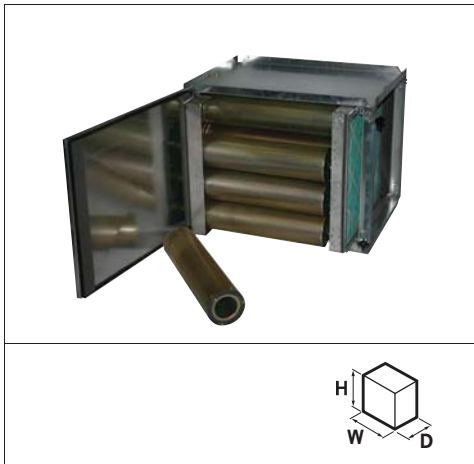
Number of Filters High	Height (inches)	1 Filter Wide	2 Filters Wide	3 Filters Wide	4 Filters Wide	5 Filters Wide	6 Filters Wide	Module Depth (inches)
		Airflow Capacity (cfm)						
½	12	1000	2000	3000	4000	5000	6000	28.50
1	24	2000	4000	6000	8000	10000	12000	
1-½	36	3000	6000	9000	12000	15000	18000	
2	48	4000	8000	12000	16000	20000	24000	
2-½	60	5000	10000	15000	20000	25000	30000	
3	72	6000	12000	18000	24000	30000	36000	
3-½	84	7000	14000	21000	28000	35000	42000	
4	96	8000	16000	24000	32000	40000	48000	
	Width (inches)	24	48	72	96	120	144	

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# CamCarb Cylinder SMH Glide/Pack®



## Advantages

- Combines high capacity sorbent canisters with side-access housings for low bypass large system gaseous contaminant control
- Side-access housing integrity with dual access doors may be up to four filters high by six filters wide

**Typical applications:** HVAC system installation in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge aluminized steel, gasketed dual access doors, anodized aluminum filter tracks for 2" deep prefilters and separate track for CamCarb Cylinders. Consult factory for stacking and reinforcement guidelines.

**Filters:** Accepts 2" deep particle prefilter and 16 CamCarb Cylinders per 24" by 24" opening.

**Additional data:** Out-turned pre-drilled standing flanges mate to other HVAC equipment.

See Literature 2118 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of Filters High	Height (inches)	½ Filter Wide	1 Filter Wide	1-½ Filters Wide	2 Filters Wide	2-½ Filters Wide	3 Filters Wide	3-½ Filters Wide	4 Filters Wide	4-½ Filters Wide	5 Filters Wide	5-½ Filters Wide	6 Filters Wide	Housing Depth (inches)
½	15.25	-	1000	-	2000	-	3000	-	4000	-	5000	-	6000	33.75
1	27.25	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	
1-½	39.50	-	3000	-	6000	-	9000	-	12000	-	15000	-	18000	
2	51.50	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000	
2-½	63.75	-	5000	-	10000	-	15000	-	20000	-	25000	-	30000	
3	75.75	-	6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000	
3-½	88.00	-	7000	-	14000	-	21000	-	28000	-	35000	-	42000	
4	100.00	-	8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000	
Width (inches)		12	24	36	48	60	72	84	96	108	120	132	144	

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

## CamSorb® 3CF Glide/Pack®



## Advantages

- High capacity, gaseous contaminant control in a Glide/Pack® housing
- Side-access housing integrity with dual access doors may be up to four filters high by six filters wide

**Typical applications:** HVAC system installation in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge galvanized steel, gasketed dual access doors, filter track for a 4" prefilter or final filter and anodized aluminum filter tracks for CamSorb CF 1" rechargeable panels (12 per 2000 cfm), weatherproof.

**Filters:** 4" deep pleated prefilter or 4" deep high efficiency final filter and 12 1" deep panels of coconut shell activated carbon or other media.

**Additional data:** Out-turned, pre-drilled standing flanges to mate to other HVAC equipment.

See Literature 2107 for more details.

## Dimensions and Airflow Capacity (cfm)

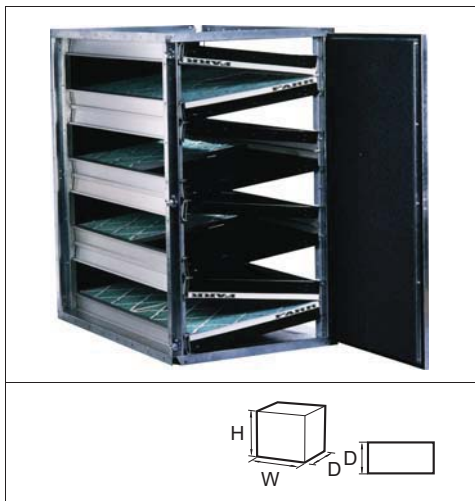
Number of Filters High	Height (inches)	1 Filter Wide	2 Filters Wide	3 Filters Wide	4 Filters Wide	5 Filters Wide	6 Filters Wide	Housing Depth (inches)
½	15.25	1000	2000	3000	4000	5000	6000	33.75
1	27.25	2000	4000	6000	8000	10000	12000	
1-½	39.50	3000	6000	9000	12000	15000	18000	
2	51.50	4000	8000	12000	16000	20000	24000	
2-½	63.75	5000	10000	15000	20000	25000	30000	
3	75.75	6000	12000	18000	24000	30000	36000	
3-½	88.00	7000	14000	21000	28000	35000	42000	
4	100.00	8000	16000	24000	32000	40000	48000	
	Width (inches)	24	48	72	96	120	144	

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# CamSorb® RS Glide/Pack®



## Advantages

- Holds four CamSorb RS80 2" deep adsorber panels and a 1" deep prefilter per 2000 cfm offering medium capacity odor removal
- Side-access housing integrity with dual access doors may be up to four filters high by six filters wide

**Typical applications:** HVAC system installation in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge galvanized steel, gasketed dual access doors, anodized aluminum filter track for four 1" prefilters and four CamSorb RS80 rechargeable or disposable adsorber panels (4 per 2000 cfm), weatherproof.

**Filters:** 1" MERV 6-8 pleated panel prefilters and 2" adsorber panels filled with coconut shell activated carbon or other optional adsorbent. Ordered separately.

**Additional data:** Out-turned pre-drilled standing flanges mate to other HVAC equipment.

See Product Sheet 2108 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of Filters High	Height (inches)	1 Filter Wide	2 Filters Wide	3 Filters Wide	4 Filters Wide	5 Filters Wide	6 Filters Wide	Housing Depth (inches)
½	15.25	1000	2000	3000	4000	5000	6000	29.75
1	27.25	2000	4000	6000	8000	10000	12000	
1-½	39.50	3000	6000	9000	12000	15000	18000	
2	51.50	4000	8000	12000	16000	20000	24000	
2-½	63.75	5000	10000	15000	20000	25000	30000	
3	75.75	6000	12000	18000	24000	30000	36000	
3-½	88.00	7000	14000	21000	28000	35000	42000	
4	100.00	8000	16000	24000	32000	40000	48000	
	Width (inches)	24	48	72	96	120	144	

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Summary Filter Frames & Housings



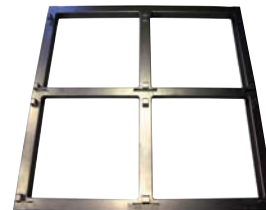
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**Frames (ASHRAE)**  
Type 8 Built-up Bank Filter  
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**Frames (ASHRAE)**  
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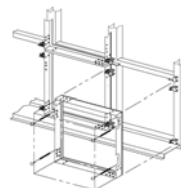
**Frames (HEPA)**  
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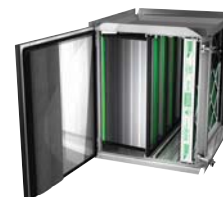
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**Housings (Containment)**  
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**Housings (Containment)**  
CamContain™ GB Housing  
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**Housings (Containment)**  
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**Housings (Containment)**  
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**Housings (Containment)**  
CamContain™ PB Prefilter  
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**Housings (Containment)**  
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**Housings (Containment)**  
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**Housings (Containment)**  
CamContain™ SBD Isolation  
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**Housings (Containment)**  
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**Housings (Containment)**  
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# FastFrame



## Advantages

- Universal, accepts any filter with a header
- Simplifies filter change by eliminating clips and fasteners
- May be assembled into banks up to six frames high by any number wide
- Replaceable gasket creates leak free system integrity, ensuring that all of the air moving through the system will be treated by the filter
- Multiple stages of filters can be installed on each frame

**Typical applications:** Built-up bank frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge galvanized steel frame with gasketed filter sealing flange, unique filter holding compression tabs accommodate any headered filter. May include multiple stages of filtration. Pre-drilled holes for bank assembly, marked top for ease of installation.

**Filters:** MERV 5 through 16. May also be used with adsorbent panels or modules.

**Additional data:** Available in stainless steel, consult factory.

See Literature 2429 for more details.

Model Number	Actual Depth (inches)	Actual Height (inches)	Actual Width (inches)	Weight (lbs.)
<b>For Built-up Bank Applications</b>				
M22001-004	2.69	24	12	4.3
M22001-002		20	20	4.9
M22001-007		24	20	5.4
M22001-001		24	24	56.0

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# Type 8 Built-up Bank Filter Holding Frame



## Advantages

- Universal filter acceptance, any filter from 1" deep to 36" deep with the application of specific fasteners
- May be assembled into banks up to six frames high by any number wide
- Leak free system integrity, ensuring that all of the air moving through the system will be treated by the filter
- Multiple stages of filters can be installed on each frame

**Typical applications:** Built-up bank frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** 16-gauge galvanized steel frame with gasketed filter seal flange, multiple lances for application of various fasteners to accommodate any 1" deep filter and up to 36" deep of multiple filter stages. Pre-drilled holes for bank assembly, marked top for ease of installation.

**Filters:** 1" MERV 6 to 12" deep MERV 15 filters. May also be used with adsorbent panels or modules.

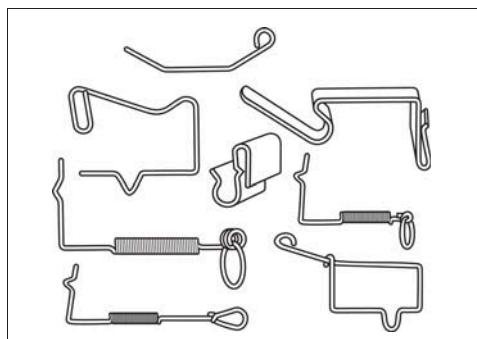
**Additional data:** Available in stainless steel, consult factory.

See Literature 2301 for more details.

Model Number	Actual Depth (inches)	Actual Height (inches)	Actual Width (inches)	Weight (lbs.)
<b>For Built-up Bank Applications</b>				
079473-004	2.69	24	12	4.3
079473-006		20	16	4.4
079473-005		25	16	5.0
079473-002		20	20	4.9
079473-003		25	20	5.5
079473-007		24	20	5.4
079473-001		24	24	6.0

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# Fasteners



## Advantages

- Ensures that air filters are held in place securely in Camfil Type 8 Holding Frame or competitor's holding frame
- Configurations to hold pleated filters, box filters or filters with headers

**Typical applications:** For securing air filters in built-up bank frames installed in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** Various forms including brass, galvanized steel or stainless steel. Consult factory.

**Filters:** Any 1" deep filter to various combinations of 2", 4", 6" and 12" ASHRAE grade filters in Camfil or competitive frames. May also be used with adsorbent panels or modules.

See Literature 2902 for more details.

**APPLICATIONS**  
 (4 fasteners per filter recommended for most applications)  
 (See Sales Drawing # 050202)

Access Model Number

30/30® Aeropleat® AP-Eleven Opti-Pac® in Type 8 Holding Frame	1" or 2" deep filter	U or D	C-70
	4" deep filter (use C-77 for Opti-Pac)	U	C-86
	4" deep filter (use C-77 for Opti-Pac)	U or D	C-77 <sup>1</sup>
	2" deep filter as a prefilter to a Riga-Flo, or Aeropac (no header)	U	C-79-1
	4" deep filter as a prefilter to a Riga-Flo, or Aeropac (no header)	U	C-79-2
	4" deep Opti-Pac with 2" deep prefilter	U	C-79-5
	4" deep Opti-Pac with 4" deep prefilter	U	C-79-6
	2" deep filter as a prefilter to a Riga-Flo E-Series (no header)	U	C-102-1
	4" deep filter as a prefilter to a Riga-Flo E-Series (no header)	U	C-102-2
	1" deep filter as a prefilter in the same frame with Hi-Flo, Riga-Flo PH-A or Aeropac (single header)	U	C-70 <sup>4</sup>
	2" deep filter as a prefilter in the same frame with Hi-Flo, Riga-Flo PH-A or Aeropac (single header). (Two C-70 should be used to hold headered filter in place, and two C-86 fasteners (or C-77) should be used to hold prefilter in place. Fasteners would be on opposite corners).	U	C-86 <sup>4</sup> or C-77 <sup>1</sup> & C-70
	4" deep filter as a prefilter in the same frame with Hi-Flo, Riga-Flo PH-A or Aeropac (single header)	U	C-89 <sup>4</sup> & C-70
2" deep filter as a prefilter in the same frame with Aeropac (double header)	U	C-103-1	
4" deep filter as a prefilter in the same frame with Aeropac (double header)	U	C-103-2	
30/30® Aeropleat® Hi-Flo® S-Flo Opti-Pac® in other Manufacturer's Holding Frame	1" deep filter	U or D	C-78-1
	2" deep filter	U or D	C-78-2
	4" deep filter	U or D	C-78-4
	1" deep filter as a prefilter to a Hi-Flo or Riga-Flo PH-A	U	C-78-2 <sup>4</sup>
	2" deep filter as a prefilter to a Hi-Flo or Riga-Flo PH-A	U	C-78-3 <sup>4</sup>
	4" deep filter as a prefilter to a Hi-Flo or Riga-Flo PH-A	U	C-78-5 <sup>4</sup>
	2" deep filter as a prefilter to an Opti-Pac	U	C-78-7

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## Frames (ASHRAE)

	APPLICATIONS (4 fasteners per filter recommended for most applications) (See Sales Drawing # 050202)	Access	Model Number
Riga-Flo® in Type 8 Holding Frame	To secure 12" deep filter — 24" x 24"	U or D	C-80 <sup>5</sup> or C-99
	To secure 12" deep filter — 24" x 12"	U or D	C-80 <sup>2</sup> or C-99 <sup>2</sup>
	To secure 6" deep filter — 24" x 24"	U or D	C-90
	To secure 6" deep filter — 24" x 12"	U or D	C-90 <sup>2</sup>
	To secure 6" deep filter as a prefilter to a 12" deep filter—24" x 24"	U	C-91
	To secure 6" deep filter as a prefilter to a 12" deep filter—24" x 12"	U	C-91 <sup>2</sup>
Riga-Flo® in other Manufacturer's Holding Frame	To secure 12" deep filter — 24" x 24"	U or D	C-83
	To secure 12" deep filter — 24" x 12"	U or D	C-83 <sup>2</sup>
	To secure 6" deep filter — 24" x 24"	U or D	C-83-6
	To secure 6" deep filter — 24" x 12"	U or D	C-83-6 <sup>2</sup>
Aeropac® Durafil® Hi-Flo® Riga-Flo® PH in Type 8 Holding Frame	To secure 12" deep Aeropac (no header) — 24" x 24", 24" x 12"	U or D	C-80 <sup>3</sup> or C-99 <sup>2</sup>
	To secure a single header pocket style filter (Hi-Flo)	U or D	C-70
	To secure a 12" deep single header style filter (Riga-Flo PH, Durafil, Aeropac)	U or D <sup>5</sup>	C-70
	To secure a 12" deep single header Aeropac style filter	U U or D	C-70 C-80
	To secure a 12" deep double header style filter	U	C-100
	To secure 6" deep single header style filter	U	C-70
	To secure 6" deep single header style filter	U or D	C-90

### Notes

- 1 When using the Camfil 30/30 Class 1 filter in this application, a C-77 fastener should be used.
- 2 Two fasteners can be used for upstream application, however it is not recommended.
- 3 C-99 is also available in place of the C-80 to allow for more clearance downstream.
- 4 Hi-Flo filters can be accessed from either upstream or downstream.
- 5 To secure a Riga-Flo PH or Durafil using upstream access only, use a C-70 fastener, part number 050025-000. For the Durafil only, the C-70 fastener
- 6 The terms upstream (U) and front access are synonymous, as are downstream (D) and rear access.
- 7 For upstream access & downstream access (Durafil and Aeropac only) where the filter goes through frame opening a C-70 fastener should be used.

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# Magna-Grid



## Advantages

- Guaranteed to provide a scannable seal on the downstream side when filter elements are properly installed
- Accepts full size 24" by 24" or 12" by 24" HEPA or ULPA filters

**Description:** 11-gauge welded factory fabricated HEPA/ULPA filter bank assembly.

**Typical applications:** Built-up bank HEPA/ULPA filter frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** 11-gauge galvanized steel super structure with flat filter sealing flange to seal against gasket on HEPA/ULPA filter. Filters are held in place by swing bolt assemblies. Grid includes filter support and alignment flanges for simplified filter service.

**Filters:** 6" or 12" deep, 24" by 24", or 24" by 12" HEPA/ULPA filters.

**Additional data:** Modules may be up to 4 filters high by 6 filters wide. Available in stainless steel, consult factory.

See Literature 2302 for more details.

## Dimensions & Airflow (cfm)

Number of Filters High	Height (inches)	2 Filters Wide	2-½ Filters Wide	3 Filters Wide	3-½ Filters Wide	4 Filters Wide	4-½ Filters Wide	5 Filters Wide	5-½ Filters Wide	6 Filters Wide
2	52.62	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000
2-½	65.38	10,000	-	15,000	-	20,000	-	25,000	-	30,000
3	77.38	12,000	15,000	18,000	21,000	24,000	27,000	30,000	33,000	36,000
3-½	90.12	14,000	-	21,000	-	28,000	-	35,000	-	42,000
4	102.12	16,000	20,000	24,000	28,000	32,000	36,000	40,000	44,000	48,000
Width (inches)		53.50	67.12	79.12	92.75	104.75	118.38	130.38	144.00	156.00

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# Magna-Frame II



## Advantages

- Multiple prefilter options possible
- Dimensionally compatible with HVAC system configurations (actual nominal frame size matches typical HVAC frame sizes)
- Guaranteed to provide a scannable seal on the downstream side when filter elements are properly installed

**Typical applications:** Built-up bank HEPA/ULPA filter frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** 14-gauge galvanized steel frame with flat filter seal flange to seal against gasket on HEPA/ULPA filter. Will accept nominal dimension filters with appropriate swing bolts. Frames are pre-punched for bolt-together assembly. Annular based dimples help to align filter and recess assembly bolts.

**Filters:** 6" or 12" deep nominal size HEPA/ULPA filters.

**Additional data:** Available in stainless steel, consult factory.

See Literature 2303B for more details.

Magna-Frame II (H x W, inches)	Holds Absolute Filter Size	Per Carton Weight (lbs)	Per Carton Cube (sq. ft.)	Standard Airflow/High Capacity (cfm)	Swing Bolts Required per Frame
24.00 x 24.00	23.38 x 23.38	20.50	2.78	1100/2000	4
24.00 x 12.00	23.38 x 11.38	13.50	1.50	460/850	4
12.00 x 24.00	11.38 x 23.38	13.50	1.50	460/850	2
24.62 x 24.62	24.00 x 24.00	21.00	2.78	1100/2000	4
24.62 x 12.62	24.00 x 12.00	14.00	1.50	460/850	4
12.62 x 24.62	12.00 x 24.00	14.00	1.50	460/850	2

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# Magna-Frame III



## Advantages

- Guaranteed to provide a scannable seal on the downstream side when filter elements are properly installed
- Multiple prefilter options possible
- Includes a knife-edge to mate with HEPA/ULPA filters with gel seal track

**Typical applications:** Built-up bank HEPA/ULPA filter frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

**Construction:** 14-gauge galvanized steel frame with knife-edge flange for mounting of nominal size HEPA/ULPA filter with integral gel seal track. Frames are pre-punched for bolt-together assembly. Annular based dimples help to align filter and recess assembly bolts.

**Filters:** 6" or 12" deep nominal size HEPA/ULPA filters.

**Additional data:** Available in stainless steel, consult factory.

See Literature 2303C for more details.

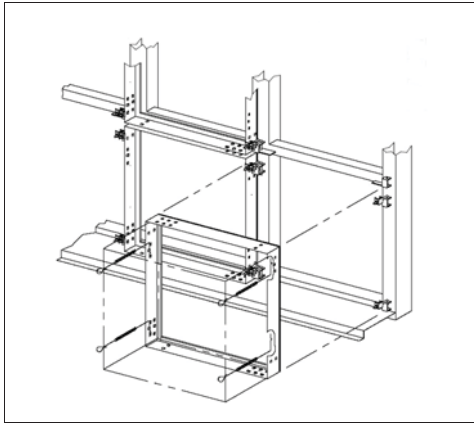
Magna-Frame III (H x W, inches)	Holds Gel Seal Absolute Filter Size (H x W inches, 12" or 6" nominal depth)	Per Carton Weight (lbs)	Per Carton Cube (sq. ft.)	Airflow Standard/High Capacity (cfm)	Swing Bolts Required per Frame
24.62 x 24.62	24.00 x 24.00	22.6	2.78	1100/2000	4
24.62 x 12.62	24.00 x 12.00	15.6	1.50	460/850	4
12.62 x 24.62	12.00 x 24.00	15.6	1.50	460/850	2

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## Absolute® Prefilter Kits



### Advantages

- Guaranteed to provide a scannable seal on the downstream side when filter elements are properly installed
- Includes a knife-edge to mate with HEPA/ULPA filters with gel seal track

**Description:** Materials that facilitate installation of a wide variety of prefilters in front of Absolute® filters in Camfil Magna-Frame or Magna-Grid systems.

**Typical applications:** Built-up bank HEPA/ULPA filter frames for installation in HVAC applications in commercial, industrial, manufacturing and medical facilities.

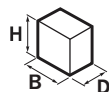
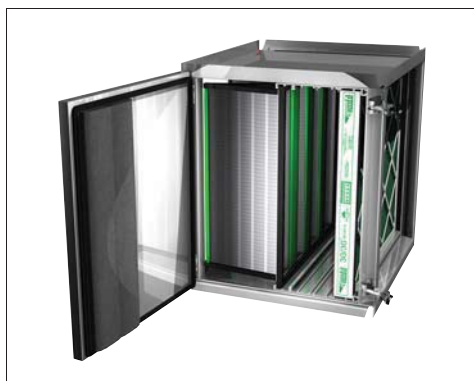
**Construction:** Includes a Type 8 Holding Frame for ASHRAE grade filters and swing bolt assemblies to install one or two stages of prefiltration upstream of the HEPA/ULPA filters.

**Filters:** Prefilters from 2" deep to 12".

**Additional data:** Available in stainless steel, consult factory.

See Literature 2902K for more details.

# GlidePack MultiTrack 25



## Advantages

- Multiple stages of filtration in a short 25" deep housing with tracks are adaptable to accommodate a 2" or 4" deep prefilter, a 2", or 4" deep intermediate particulate or carbon filter, and a 6" or 12" deep rigid or pocket final filter
- Housing efficiency equal to the applied filtration efficiency
- Less than 1/2 of 1% leakage guaranteed

**Typical applications:** Two-stage filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing and pneumatic taps for installation of static pressure gauge(s).

**Filters:** MERV filters, a 2" or 4" deep prefilter, a 2", or 4" deep intermediate particulate or carbon filter, and a 6" or 12" deep rigid or pocket final filter.

**Performance:** Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2425 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of filters high	Height (inches)	1/2 Filter wide	1 Filter wide	1-1/2 Filters wide	2 Filters wide	2-1/2 Filters wide	3 Filters wide	3-1/2 Filters wide	4 Filters wide	4-1/2 Filters wide	5 Filters wide	5-1/2 Filters wide	6 Filters wide	Housing depth (inches)
1/2	15		1000		2000		3000		4000		5000		6000	13
1	27	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	
1-1/2	40		3000		6000		9000		12000		15000		18000	
2	52	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000	
2-1/2	64		5000		10000		15000		20000		25000		30000	
3	76	6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000		
3-1/2	88		7000		14000		21000		28000		35000		42000	
4	100	8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000		
	Width (inches)	11	23	35	47	58	70	82	94	105	117	128	140	

Values rounded to the nearest whole value.

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# GlidePack MultiTrack 13



## Advantages

- Multiple stages of filtration in a short housing depth with tracks adaptable to accommodate multiple stages of filtration
- Housing efficiency equal to the applied filtration efficiency
- Less than 1/2 of 1% leakage guaranteed

**Typical applications:** Two-stage filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing and a pneumatic tap for installation of static pressure gauge.

**Filters:** MERV filters, three 2" filters, or one 2" filter and one 4" filter.

**Performance:** Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2426 for more details.

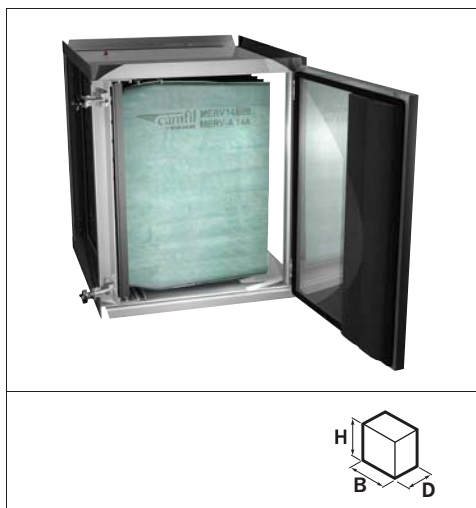
## Dimensions and Airflow Capacity (cfm)

Number of filters high	Height (inches)	1/2 Filter wide	1 Filter wide	1-1/2 Filters wide	2 Filters wide	2-1/2 Filters wide	3 Filters wide	3-1/2 Filters wide	4 Filters wide	4-1/2 Filters wide	5 Filters wide	5-1/2 Filters wide	6 Filters wide	Housing depth (inches)
1/2	15		1000		2000		3000		4000		5000		6000	13
1	27	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	
1-1/2	40		3000		6000		9000		12000		15000		18000	
2	52	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000	
2-1/2	64		5000		10000		15000		20000		25000		30000	
3	76		6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000	
3-1/2	88		7000		14000		21000		28000		35000		42000	
4	100		8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000	
	<b>Width (inches)</b>	<b>11</b>	<b>23</b>	<b>35</b>	<b>47</b>	<b>58</b>	<b>70</b>	<b>82</b>	<b>94</b>	<b>105</b>	<b>117</b>	<b>128</b>	<b>140</b>	

Values rounded to the nearest whole value.

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

# GlidePack UniTrack



## Advantages

- Multiple stages of filtration in a short 13" or 25" depth housing with tracks adaptable to accommodate a sort depth bag filters or 6-inch deep box filters in the GlidePack UniTrack 13, or longer bags or 12-inch deep box filters in the GlidePack UniTrack 2.
- using efficiency equal to the applied filtration efficiency
- less than 1/2 of 1% leakage guaranteed.

**Typical applications:** Single-stage filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gaskets.

**Filters:** MERV filters, a 1-inch nominal size filter header track, that will hold short depth bag filters or 6-inch deep box filters in the GlidePack UniTrack 13, or longer bags or 12-inch deep box filters in the GlidePack UniTrack 25.

**Performance:** Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2427 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of filters high	Height (inches)	1/2 Filter wide	1 Filter wide	1-1/2 filters wide	2 Filters wide	2-1/2 Filters wide	3 Filters wide	3-1/2 Filters wide	4 Filters wide	4-1/2 Filters wide	5 Filters wide	5-1/2 Filters wide	6 Filters wide	Housing depth (inches)
1/2	15		1000		2000		3000		4000		5000		6000	13
1	27	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	
1-1/2	40		3000		6000		9000		12000		15000		18000	
2	52	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000	
2-1/2	64		5000		10000		15000		20000		25000		30000	
3	76		6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000	
3-1/2	88		7000		14000		21000		28000		35000		42000	
4	100		8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000	
	<b>Width (inches)</b>	<b>11</b>	<b>23</b>	<b>35</b>	<b>47</b>	<b>58</b>	<b>70</b>	<b>82</b>	<b>94</b>	<b>105</b>	<b>117</b>	<b>128</b>	<b>140</b>	

Values rounded to the nearest whole value.

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# 3P Glide/Pack®



## Advantages

- Less than 1/2 of 1% leakage guaranteed
- Housing efficiency equal to the applied filtration efficiency

**Typical applications:** Two-stage filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing and a pneumatic tap for installation of static pressure gauge.

**Filters:** Any 2" deep prefilter with any 4", 6", or 12" final filter, or multi-pocket filter as the second stage.

**Performance:** Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2401 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of filters high	Height (inches)	1/2 Filter wide	1 Filter wide	1-1/2 Filters wide	2 Filters wide	2-1/2 Filters wide	3 Filters wide	3-1/2 Filters wide	4 Filters wide	4-1/2 Filters wide	5 Filters wide	5-1/2 Filters wide	6 Filters wide	Housing depth (inches)	
1/2	15.25		1000		2000		3000		4000		5000		6000	21.00	
1	27.25	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000		
1-1/2	39.50		3000		6000		9000		12000		15000		18000		
2	51.50	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000		
2-1/2	63.75		5000		10000		15000		20000		25000		30000		
3	75.75		6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000		
3-1/2	88.00		7000		14000		21000		28000		35000		42000		
4	100.00		8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000		
	<b>Width (inches)</b>	<b>12</b>	<b>24</b>	<b>36</b>	<b>48</b>	<b>60</b>	<b>72</b>	<b>84</b>	<b>96</b>	<b>108</b>	<b>120</b>	<b>132</b>	<b>144</b>		

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# 4P Glide/Pack®



## Advantages

- Single-stage filtration in a short depth (12") side access housing
- Housing efficiency equal to the applied filtration efficiency

**Typical applications:** Single-stage filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing.

**Filters:** Any 1" thru 6" deep filter.

**Performance:** Less than 1/2 of 1% leakage guaranteed. Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2405 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of filters high	Height (inches)	½ Filter wide	1 Filter wide	1½ Filters wide	2 Filters wide	2 ½ Filters wide	3 Filters wide	3½ Filters wide	4 Filters wide	4½ Filters wide	5 Filters wide	5½ Filters wide	6 Filters wide	Housing depth (inches)	
½	15.25		1000		2000		3000		4000		5000		6000	12.00	
1	27.25	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000		
1½	39.50		3000		6000		9000		12000		15000		18000		
2	51.50	2000	4000	6000	8000	10000	12000	14000	16000	18000	20000	22000	24000		
2½	63.75		5000		10000		15000		20000		25000		30000		
3	75.75		6000	9000	12000	15000	18000	21000	24000	27000	30000	33000	36000		
3½	88.00		7000		14000		21000		28000		35000		42000		
4	100.00		8000	12000	16000	20000	24000	28000	32000	36000	40000	44000	48000		
	<b>Width (inches)</b>	<b>12</b>	<b>24</b>	<b>36</b>	<b>48</b>	<b>60</b>	<b>72</b>	<b>84</b>	<b>96</b>	<b>108</b>	<b>120</b>	<b>132</b>	<b>144</b>		

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# V-Bank Glide/Pack®



## Advantages

- V-bank design reduces filter velocity and filter pressure drop by up to 60%, saving energy
- Increases life of filters up to four times

**Typical applications:** Single-stage V-bank filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing.

**Filters:** Any 2" deep filter.

**Performance:** Less than 1/2 of 1% leakage guaranteed. Rated airflow 500 fpm, may be operated to 625 fpm. Standard model operational to ± 6.0" w.g.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Includes pneumatic fitting for static pressure gauge.

See Literature 2421 for more details.

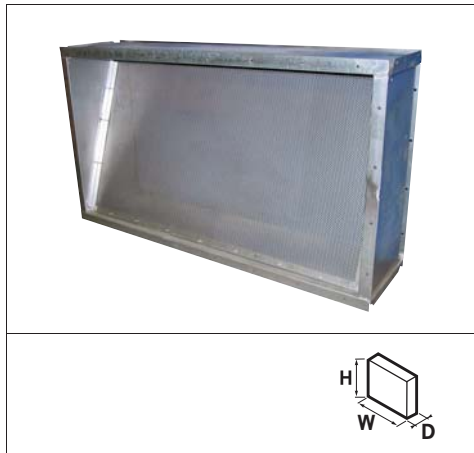
## Dimensions and Airflow Capacity (cfm)

Number of filters wide	Height (inches)	1/2 Filter wide	1 Filter wide	1-1/2 Filters wide	2 Filters wide	2-1/2 Filters wide	3 Filters wide	3-1/2 Filters wide	4 Filters wide	4-1/2 Filters wide	5 Filters wide	5-1/2 Filters wide	6 Filters wide	Housing depth (inches)
1/2	15.25	-	2,000	-	4,000	-	6,000	-	8,000	-	10,000	-	12,000	28.00
1	27.25	2,000	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	
1-1/2	39.50	-	6,000	-	12,000	-	18,000	-	24,000	-	30,000	-	36,000	
2	51.50	4,000	8,000	12,000	16,000	20,000	24,000	28,000	32,000	36,000	40,000	44,000	48,000	
2-1/2	63.75	-	10,000	-	20,000	-	30,000	-	40,000	-	50,000	-	60,000	
3	75.75	6,000	12,000	18,000	24,000	30,000	36,000	42,000	48,000	54,000	60,000	66,000	72,000	
3-1/2	88.00	-	14,000	-	28,000	-	42,000	-	54,000	-	70,000	-	84,000	
4	100.00	8,000	16,000	24,000	32,000	40,000	48,000	56,000	60,000	72,000	80,000	88,000	96,000	
Width (inches)		12	24	36	48	60	72	84	96	108	120	132	144	

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## Diffuser/Pack



### Advantages

- Factory assembled air diffuser section to ensure even airflow across HVAC components
- Ensures even filter loading and even flow across heat exchangers, reducing system energy expenditure

**Typical applications:** Air diffuser section for HVAC systems in commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges and angled, perforated steel air diffuser plate.

**Performance:** Adds less than 0.10" w.g. to system static pressure.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2407 for more details.

### Dimensions and Airflow Capacity (cfm)

Number of filters wide	Height (inches)	½ Filter wide	1 Filter wide	1-½ Filters wide	2 Filters wide	2-½ Filters wide	3 Filters wide	3-½ Filters wide	4 Filters wide	4-½ Filters wide	5 Filters wide	5-½ Filters wide	6 Filters wide	Housing depth (inches)
½	15.25	-	2,000	-	4,000	-	6,000	-	8,000	-	10,000	-	12,000	12.00
1	27.25	2,000	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	
1-½	39.50	-	6,000	-	12,000	-	18,000	-	24,000	-	30,000	-	36,000	
2	51.50	4,000	8,000	12,000	16,000	20,000	24,000	28,000	32,000	36,000	40,000	44,000	48,000	
2-½	63.75	-	10,000	-	20,000	-	30,000	-	40,000	-	50,000	-	60,000	
3	75.75	6,000	12,000	18,000	24,000	30,000	36,000	42,000	48,000	54,000	60,000	66,000	72,000	
3-½	88.00	-	14,000	-	28,000	-	42,000	-	54,000	-	70,000	-	84,000	
4	100.00	8,000	16,000	24,000	32,000	40,000	48,000	56,000	60,000	72,000	80,000	88,000	96,000	
	Width (inches)	12	24	36	48	60	72	84	96	108	120	132	144	

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# ECO Moisture/Pack



## Advantages

- Single-stage filter housing for removal of oil or water mist
- Includes drain connection that may be plumbed for oil or water reclamation or removal

**Typical applications:** Single-stage oil or water mist filter housing for commercial, industrial, manufacturing or medical facilities.

**Construction:** 16-gauge galvanized steel with pre-drilled standing flanges, dual access doors, UV-resistant door knobs, door and filter sealing gasketing.

**Filters:** 4" deep Camfil ECO Moisture Separators.

**Performance:** Removal efficiency exceeds 98% on droplets 20 micron in size when matched with Camfil ECO Moisture Separator. Rated airflow 500 fpm, consult factory for efficiency at other velocities.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2408 for more details.

## Dimensions and Airflow Capacity (cfm)

Number of filters wide	Height (inches)	½ Filter wide	1 Filter wide	1-½ Filters wide	2 Filters wide	2-½ Filters wide	3 Filters wide	3-½ Filters wide	4 Filters wide	4-½ Filters wide	5 Filters wide	5-½ Filters wide	6 Filters wide	Housing depth (inches)	
½	15.25	-	2,000	-	4,000	-	6,000	-	8,000	-	10,000	-	12,000	12	
1	27.25	2,000	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000		
1-½	39.50	-	6,000	-	12,000	-	18,000	-	24,000	-	30,000	-	36,000		
2	51.50	4,000	8,000	12,000	16,000	20,000	24,000	28,000	32,000	36,000	40,000	44,000	48,000		
2-½	63.75	-	10,000	-	20,000	-	30,000	-	40,000	-	50,000	-	60,000		
3	75.75	6,000	12,000	18,000	24,000	30,000	36,000	42,000	48,000	54,000	60,000	66,000	72,000		
3-½	88.00	-	14,000	-	28,000	-	42,000	-	54,000	-	70,000	-	84,000		
4	100.00	8,000	16,000	24,000	32,000	40,000	48,000	56,000	60,000	72,000	80,000	88,000	96,000		
Width (inches)		12	24	36	48	60	72	84	96	108	120	132	144		

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# Dynavane® Inertial Air Cleaner



## Advantages

- Services large air volume systems at high velocities, separating contaminants through inertial separation
- Constant pressure drop, self-cleaning

**Typical applications:** High volume HVAC systems in high ambient dust laden applications.

**Construction:** 11-gauge mild steel, bolt-on flanges for HVAC system connection and bleed outlet, removable blade pack and four mesh inlet screens.

**Additional data:** Typical bleed air is 10%. Available to service airflows up to 48,600 cfm.

See Literature 4207 for more details.

## Airflow (cfm) at Various Pressure Drops

Model Designation (Cells High)	# of Cells Wide	0.75" w.g. Clean	0.75" w.g. Bleed	1.0" w.g. Clean	1.0" w.g. Bleed	1.25" w.g. Clean	1.25" w.g. Bleed	Weight (lbs.)
1 DV Single Cell	1	810	90	935	104	1060	118	110
1 DV Single Cell	2	1620	180	1870	208	2120	236	168
1 DV Single Cell	3	2430	270	2805	312	3180	353	226
1 DV Single Cell	4	3240	360	3740	416	4240	471	284
1 DV Single Cell	5	4050	450	4675	519	5300	589	342
1 DV Single Cell	6	4860	540	5610	623	6360	707	400
1 DV Single Cell	7	5670	630	6545	727	7420	824	458
1 DV Single Cell	8	6480	720	7480	831	8480	942	516
1 DV Single Cell	9	7290	810	8415	935	9540	1060	574
1 DV Single Cell	10	8100	900	9350	1039	10600	1178	632
1 DV Single Cell	11	8910	990	10285	1143	11660	1296	690
1 DV Single Cell	12	9720	1080	11220	1247	12720	1413	748
1 DV Single Cell	13	10530	1170	12155	1351	13780	1531	806
1 DV Single Cell	14	11340	1260	13090	1454	14840	1649	864
1 DV Single Cell	15	12150	1350	14025	1558	15900	1767	922
1 DV Single Cell	16	12960	1440	14960	1662	16960	1884	980
1 DV Single Cell	17	13770	1530	15895	1766	18020	2002	1038
1 DV Single Cell	18	14580	1620	16830	1870	19080	2120	1096
1 DV Single Cell	19	15390	1710	17765	1974	20140	2238	1154
1 DV Single Cell	20	16200	1800	18700	2078	21200	2356	1212
2 DV Double Cell	1	1620	180	1870	208	2120	236	233
2 DV Double Cell	2	3240	360	3740	416	4240	471	342
2 DV Double Cell	3	4860	540	5610	623	6360	707	451
2 DV Double Cell	4	6480	720	7480	831	8480	942	560
2 DV Double Cell	5	8100	900	9350	1039	10600	1178	669

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Housings (ASHRAE)

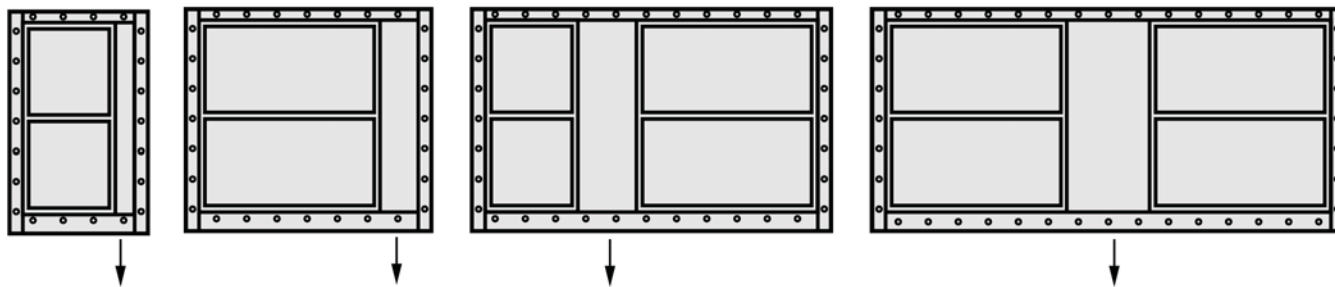
Model Designation (Cells High)	# of Cells Wide	0.75" w.g. Clean	0.75" w.g. Bleed	1.0" w.g. Clean	1.0" w.g. Bleed	1.25" w.g. Clean	1.25" w.g. Bleed	Weight (lbs.)
2 DV Double Cell	6	9720	1080	11220	1247	12720	1413	778
2 DV Double Cell	7	11340	1260	13090	1454	14840	1649	887
2 DV Double Cell	8	12960	1440	14960	1662	16960	1884	996
2 DV Double Cell	9	14580	1620	16830	1870	19080	2120	1105
2 DV Double Cell	10	16200	1800	18700	2078	21200	2356	1214
2 DV Double Cell	11	17820	1980	20570	2286	23320	2591	1323
2 DV Double Cell	12	19440	2160	22440	2493	25440	2827	1432
2 DV Double Cell	13	21060	2340	24310	2701	27560	3062	1541
2 DV Double Cell	14	22680	2520	26180	2909	29680	3298	1650
2 DV Double Cell	15	24300	2700	28050	3117	31800	3533	1759
2 DV Double Cell	16	25920	2880	29920	3324	33920	3769	1868
2 DV Double Cell	17	27540	3060	31790	3532	36040	4004	1977
2 DV Double Cell	18	29160	3240	33660	3740	38160	4240	2086
2 DV Double Cell	19	30780	3420	35530	3948	40280	4476	2195
2 DV Double Cell	20	32400	3600	37400	4156	42400	4711	2304
3 DV Triple Cell	1	2430	270	2805	312	3180	353	360
3 DV Triple Cell	2	4860	540	5610	623	6360	707	535
3 DV Triple Cell	3	7290	810	8415	935	9540	1060	710
3 DV Triple Cell	4	9720	1080	11220	1247	12720	1413	885
3 DV Triple Cell	5	12150	1350	14025	1558	15900	1767	1060
3 DV Triple Cell	6	14580	1620	16830	1870	19080	2120	1235
3 DV Triple Cell	7	17010	1890	19635	2182	22260	2473	1410
3 DV Triple Cell	8	19440	2160	22440	2493	25440	2827	1585
3 DV Triple Cell	9	21870	2430	25245	2805	28620	3180	1760
3 DV Triple Cell	10	24300	2700	28050	3117	31800	3533	1895
3 DV Triple Cell	11	26730	2970	30855	3428	34980	3887	2110
3 DV Triple Cell	12	29160	3240	33660	3740	38160	4240	2285
3 DV Triple Cell	13	31590	3510	36465	4052	41340	4593	2460
3 DV Triple Cell	14	34020	3780	39270	4363	44520	4947	2635
3 DV Triple Cell	15	36450	4050	42075	4675	47700	5300	2810
3 DV Triple Cell	16	38880	4320	44880	4987	50880	5653	2985
3 DV Triple Cell	17	41310	4590	47685	5298	54060	6007	3160
3 DV Triple Cell	18	43740	4860	50490	5610	57240	6360	3335
3 DV Triple Cell	19	46170	5130	53295	5922	60420	6713	3510
3 DV Triple Cell	20	48600	5400	56100	6233	63600	7067	3685

Continued on next page...

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Housings (ASHRAE)



Shown above are front view, arrangement 1, arrangement 2, arrangement 3 and arrangement 4 respectively. Arrows denote bleed release areas.

Arrangement 1				Arrangement 2				Arrangement 3				Arrangement 4				Height (inches)
Size	# of Cells	Width (inches)	Weight (lbs.)	Size	# of Cells	Width (inches)	Weight (lbs.)	Size	# of Cells	Width (inches)	Weight (lbs.)	Size	# of Cells	Width (inches)	Weight (lbs.)	
1-10	10	29.88	845	2-10	20	59.31	1500	3-10	30	88.94	2135	4-10	40	118.38	2780	51.25
1-11	11	29.88	919	2-11	22	59.31	1628	3-11	33	88.94	2315	4-11	44	118.38	3015	56.25
1-12	12	29.88	993	2-12	24	59.56	1756	3-12	36	89.19	2495	4-12	48	118.38	3250	61.25
1-13	13	30.06	1067	2-13	26	60.00	1884	3-13	39	89.81	2675	4-13	52	119.19	3485	66.25
1-14	14	30.31	1141	2-14	28	60.19	2012	3-14	42	90.31	2855	4-14	56	120.03	3720	71.25
1-15	15	30.50	1215	2-15	30	60.56	2140	3-15	45	90.44	3035	4-15	60	120.88	3955	76.25
1-16	16	30.69	1289	2-16	32	60.94	2268	3-16	48	91.38	3215	4-16	64	121.69	4190	81.25
1-17	17	30.91	1363	2-17	34	61.44	2396	3-17	51	92.12	3395	4-17	68	122.44	4425	86.25
1-18	18	31.09	1437	2-18	36	61.75	2524	3-18	54	92.62	3575	4-18	72	123.22	4660	91.25
1-19	19	31.28	1511	2-19	38	62.19	2652	3-19	57	93.19	3755	4-19	76	123.94	4895	96.25
1-20	20	31.53	1585	2-20	40	62.62	2780	3-20	60	93.88	3935	4-20	80	125.00	5130	101.25
1-21	21	31.88	1659	2-21	42	63.31	2908	3-21	63	94.94	4115	4-21	84	126.38	5365	106.25
1-22	22	32.25	1733	2-22	44	64.06	3036	3-22	66	96.06	4295	4-22	88	127.75	5600	111.25
1-23	23	32.59	1807	2-23	46	64.81	3164	3-23	69	97.19	4475	4-23	92	128.12	5835	116.25
1-24	24	32.94	1881	2-24	48	65.50	3292	3-24	72	98.19	4655	4-24	96	130.50	6070	121.25
1-25	25	33.31	1955	2-25	50	66.25	3420	3-25	75	99.31	4835	4-25	100	132.25	6305	126.25
1-26	26	33.66	2029	2-26	52	66.88	3548	3-26	78	100.31	5015	4-26	104	133.56	6540	131.25
1-27	27	34.03	2103	2-27	54	67.69	3676	3-27	81	101.50	5195	4-27	108	135.00	6775	136.25
1-28	28	34.38	2177	2-28	56	68.31	3804	3-28	84	102.44	5375	4-28	112	136.38	7010	141.25

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# Sidelock



## Advantages

- 600 pounds of filter sealing integrity against each Absolute® filter to ensure leak free performance
- Short in-line depth of 25" conserves valuable space for processes or other HVAC components

**Typical applications:** Absolute® filter housing for commercial, industrial, medical or clean process manufacturing facilities.

**Construction:** 14-gauge galvanized steel with standing flanges, dual access doors, crank type filter mount fixtures, knife-edge filter seal mount, self-adjusting door clamping fixtures, and door sealing gaskets. Includes a filter track for 2" prefilter.

**Filters:** Any 6" or 12" Absolute filter and a 2" deep prefilter.

**Performance:** Standard filter velocity is 500 fpm for high capacity Absolutes. Reduce velocity by 45% for standard Absolutes.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2415 for more details.

Filter Sizes (inches)	Model	Filter Qty	Height (inches)	Width (inches)	Depth (inches)	Capacity with XS Absolute @ 1.0" w.g.	Capacity with XH Absolute @ 1.0" w.g.	Capacity with XH Absolute @ 1.35" w.g.	Weight (lbs.)
24 x 24 x 11-1/2	SAD-20-20-242412	1	27.25	27.00	25	1180	1500	2000	160
24 x 24 x 11-1/2	SAD-20-40-242412	2	27.25	51.00	25	2360	3000	4000	240
24 x 24 x 11-1/2	SAD-20-60-242412	3	27.25	75.00	25	3540	4500	6000	340
24 x 24 x 11-1/2	SAD-20-80-242412	4	27.25	99.00	25	4720	6000	8000	410
24 x 24 x 11-1/2	SAD-20-100-242412	5	27.25	123.00	25	5900	7500	10000	500
24 x 24 x 11-1/2	SAD-40-20-242412	2	51.56	27.00	25	2360	3000	4000	225
24 x 24 x 11-1/2	SAD-40-40-242412	4	51.56	51.00	25	4720	6000	8000	300
24 x 24 x 11-1/2	SAD-40-60-242412	6	51.56	75.00	25	7080	9000	12000	420
24 x 24 x 11-1/2	SAD-40-80-242412	8	51.56	99.00	25	9440	12000	16000	500
24 x 24 x 11-1/2	SAD-40-100-242412	10	51.56	123.00	25	11800	15000	20000	680
24 x 24 x 11-1/2	SAD-60-20-242412	3	75.87	27.00	25	3540	4500	6000	390
24 x 24" x 11-1/2	SAD-60-40-242412	6	75.87	51.00	25	7080	9000	12000	480
24 x 24 x 11-1/2	SAD-60-60-242412	9	75.87	75.00	25	10620	13500	18000	560
24 x 24 x 11-1/2	SAD-60-80-242412	12	75.87	99.00	25	14160	18000	24000	640
24 x 24 x 11-1/2	SAD-60-100-242412	15	75.87	123.00	25	17700	22500	30000	720
23- x 23-3/8" x 11-1/2	SAD-20-20-232312	1	26.68	26.37	25	1110	1410	1890	160
23 3/8" x 23-3/8" x 11-1/2	SAD-20-40-232312	2	26.68	49.75	25	2220	2820	3780	240
23-3/8" x 23-3/8" x 11-1/2	SAD-20-60-232312	3	26.68	73.12	25	3330	4230	5670	340
23-3/8" x 23-3/8" x 11-1/2	SAD-20-80-232312	4	26.68	96.50	25	4440	5640	7560	410
23-3/8" x 23-3/8" x 11-1/2	SAD-20-100-232312	5	26.68	119.87	25	5550	7050	9450	500
23-3/8" x 23-3/8" x 11-1/2	SAD-40-20-232312	2	50.37	26.37	25	2220	2820	3780	225
23-3/8" x 23-3/8" x 11-1/2	SAD-40-40-232312	4	50.37	49.75	25	4440	56410	7560	300
23-3/8" x 23-3/8" x 11-1/2	SAD-40-60-232312	6	50.37	73.12	25	6660	8460	11340	420
23-3/8" x 23-3/8" x 11-1/2	SAD-40-80-232312	8	50.37	96.50	25	8880	11280	15120	500
23-3/8" x 23-3/8" x 11-1/2	SAD-40-100-232312	10	50.37	119.87	25	11100	14100	18900	680
23-3/8" x 23-3/8" x 11-1/2	SAD-60-20-232312	3	74.06	26.37	25	3330	4230	5670	390
23-3/8" x 23-3/8" x 11-1/2	SAD-60-40-232312	6	74.06	49.75	25	6660	8460	11340	480
23-3/8" x 23-3/8" x 11-1/2	SAD-60-60-232312	9	74.06	73.12	25	9990	12690	17010	560
23-3/8" x 23-3/8" x 11-1/2	SAD-60-80-232312	12	74.06	96.50	25	13320	16920	22680	640
23-3/8" x 23-3/8" x 11-1/2	SAD-60-100-232312	15	74.06	119.87	25	16650	21150	28350	720
24" x 12" x 11-1/2	SAD-20-10-241212	1	27.25	15.00	25	540	680	900	130
24" x 18" x 11-1/2	SAD-20-16-241812	1	27.25	21.00	25	860	1090	1460	140
24" x 30" x 11-1/2	SAD-20-26-243012	1	27.25	33.00	25	1500	1900	2540	180

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# Magna/Pack



## Advantages

- Positive sealing integrity in a side access housing for Absolute® filters
- Filter housing integrity equivalent to the installed filter's integrity

**Typical applications:** Absolute® filter housing for commercial, industrial, medical or clean process manufacturing facilities.

**Construction:** 14-gauge galvanized steel with standing flanges, dual access doors, swing-bolt filter mount fixtures, self-adjusting door clamping fixtures, door sealing gaskets and a filter testing challenge introduction tap.

**Filters:** Any 6" or 12" Absolute filter. Available with a 2" prefilter track.

**Performance:** Standard filter velocity is 500 fpm for high capacity Absolutes. Reduce velocity by 45% for standard Absolutes.

**Additional data:** Sizes available from 4 filters high to 6 filters wide. Housing is weatherproof for outside installation without modification. Available with insulation, primed for painting, or in stainless steel construction. Consult factory.

See Literature 2411 for more details.

## Dimensions and Airflow Capacities (cfm)

Number of filters high	Height (inches)	½ Filter wide	1 Filter wide	1-½ Filters wide	2 Filters wide	2-½ Filters wide	3 Filters wide	3-½ Filters wide	4 Filters wide	4-½ Filters wide	5 Filters wide	5-½ Filters wide	6 Filters wide	Housing depth (inches)
½	16.50	-	1,000	-	2,000	-	3,000	-	4,000	-	5,000	-	6,000	27
1	28.50	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,000	
1-½	40.50	-	3,000	-	6,000	-	9,000	-	12,000	-	15,000	-	18,000	
2	52.50	2,000	4,000	6,000	8,000	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	
2-½	64.50	-	5,000	-	10,000	-	15,000	-	20,000	-	25,000	-	30,000	
3	76.50	3,000	6,000	9,000	12,000	15,000	18,000	21,000	24,000	27,000	30,000	33,000	36,000	
3-½	88.50	-	7,000	-	14,000	-	21,000	-	28,000	-	35,000	-	42,000	
4	100.50	4,000	8,000	12,000	16,000	20,000	24,000	28,000	32,000	36,000	40,000	44,000	48,000	
4-½	112.50	-	9,000	-	18,000	-	27,000	-	36,000	-	45,000	-	54,000	
5	124.50	5,000	10,000	15,000	20,000	25,000	30,000	35,000	40,000	45,000	50,000	55,000	60,000	
	Width (inches)	14.38	26.38	40.00	52.00	65.62	77.62	91.25	103.25	116.88	128.88	142.50	154.50	

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# CamContain



## Advantages

- Complete self-contained air filtration systems for removal of hazardous contaminants
- Performance matched and optimized components

**Typical applications:** Hospital isolation rooms/wards and Intensive Care Units (ICUs) for the control of airborne pathogens, viral contaminants and infectious organisms.

**Construction:** Matched components can include bag-in/bag-out section, prefilter section, testing section and an optimized fan section.

**Filters:** Absolute® filters and various grades of ASHRAE grade filters for prefiltration.

**Additional data:** Consult factory or Literature 3424 for additional information.

## Advancing the Industry with Secure Containment Technology

- As a non-intrusive filter validation system (NIFV), an automatic scanning system allows for validation tests to be conducted while labs are operational, eliminating downtime and minimizing the risk of exposure to maintenance personnel or contamination to adjacent spaces. This results in a significantly lower Total Cost of Ownership (TCO).

- With a fully welded, pressure decay tested construction, CamContain ABS is 40 percent smaller than conventional filtration systems, greatly reducing the amount of space required for installation while still ensuring a uniform aerosol challenge distribution. The innovative configurable design allows for CamContain ABS to be positioned horizontally or vertically, and manipulated to accommodate a variety of duct combinations.

- The integrated platform of CamContain ABS incorporates a 360° rotatable, bubble-tight fitting option that can be configured for any type of inlet or outlet orientation.

- Linear bio-seal dampers have been designed to ensure the long-term integrity of the system. Certified to be bubble-tight after 15,000 cycles, the dampers require 27.1 Newton Meters (20 Pound Feet) of torque to seal, a reduction of approximately 70 percent compared to conventional filtration dampers.

- The unique design of the CamContain ABS filtration housing ensures uniform particle distribution during the filtration cycle, and allows for effective decontamination in preparation of filter changes.

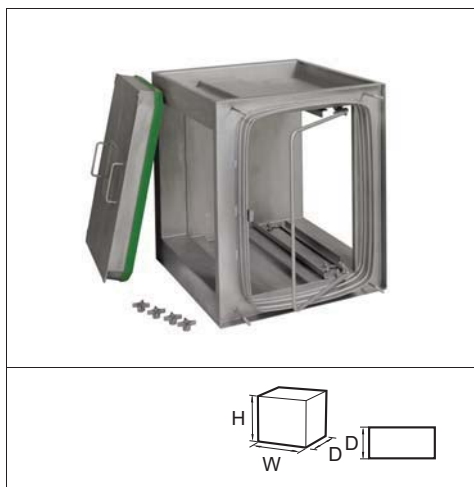


*The CamContain Filter Validation System (FVS) is an integrated and intelligent auto-scanning software package that allows for validation tests to occur while labs are still active. Innovative in design, and configurable to meet proprietary requirements, the CamContain FVS increases the quality and accuracy of revalidation procedures by reducing exposure to test personnel and adjacent environments, while increasing the speed of in situ tests.*

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.



# CamContain™ FB Housing (fluid seal)



## Advantages

- Positive sealing integrity in a side access bag-in/bag-out housing for fluid seal Absolute® filters
- Complete capture of airborne contaminants

**Typical applications:** Chemical manufacturing facilities, food processing, genetic research and biotechnology facilities, hospital isolation suites to prevent the spread of infectious diseases, industrial processes exhaust, microelectronic and semiconductor facilities, nuclear power plants, pharmaceutical facilities, radioisotope handling facilities, university research laboratories, US Department of Energy Facilities, veterinary research and animal disease laboratories, and specific United States Government and military facilities.

**Construction:** Containment level housing. See Product Sheet 3401 for construction details.

**Filters:** Fluid seal Absolute® filters or HEGA filters.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection can be accomplished.

Consult factory or Literature 3401 for more information.

## Dimensions 012-1FB

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
1 x 1	N/A		27			230
1 x 2	N/A		51	30		345
1 x 3	N/A		75			460
2 x 1	N/A		27			410
2 x 2	N/A		51	60		615
2 x 3	N/A		75			805
3 x 1	N/A	12	27		26	590
3 x 2	N/A		51	90		880
3 x 3	N/A		75			1150
4 x 1	N/A		27			765
4 x 2	N/A		51	120		1145
4 x 3	N/A		75			1497

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**Housings (Containment)**  
**Dimensions 016-1FB**

HousingSize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	N/A		15			135
½ x 1			27	18		175
1 x 1			27			210
1 x 2			51	30		320
1 x 3			75			425
2 x 1			27			375
2 x 2		16	51	60	26	570
2 x 3	75		745			
3 x 1	27		540			
3 x 2			51	90		815
3 x 3			75			1170
4 x 1			27			700
4 x 2			51	120		1060
4 x 3			75			1390

**Dimensions 018-1FB**

Housingsize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			155
½ x 1			27	18		205
1 x 1			27			245
1 x 2			51	30		370
1 x 3			75			485
2 x 1			27			435
2 x 2	N/A	18	51	60	33	645
2 x 3			75	850		
3 x 1			27	625		
3 x 2			51	90		930
3 x 3			75			1210
4 x 1			27			815
4 x 2			51	120		1210
4 x 3			75			1575

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

**Housings (Containment)**

**Dimensions 212-1FB**

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			135
½ x 1			27	18		175
1 x 1			27			210
1 x 2			51	30		320
1 x 3			75			425
2 x 1			27			375
2 x 2	2	12	51	60	33	570
2 x 3			75			745
3 x 1			27			540
3 x 2			51	90		815
3 x 3			75			1070
4 x 1			27			700
4 x 2			51	120		1060
4 x 3			75			1390

**Dimensions 216-1FB**

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			145
½ x 1			27	18		195
1 x 1			27			230
1 x 2			51	30		345
1 x 3			75			460
2 x 1			27			410
2 x 2	2	16	51	60	34	615
2 x 3			75			805
3 x 1			27			590
3 x 2			51	90		880
3 x 3			75			1150
4 x 1			27			765
4 x 2			51	120		1145
4 x 3			75			1497

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**Housings (Containment)**  
**Dimensions 218-1FB**

Housingsize (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			155
½ x 1			27	18		205
1 x 1			27			245
1 x 2			51	30		370
1 x 3			75			485
2 x 1			27			435
2 x 2	2	18	51	60	36	645
2 x 3			75			850
3 x 1			27			625
3 x 2			51	90		930
3 x 3			75			1210
4 x 1			27			815
4 x 2			51	120		1210
4 x 3			75			1575

**Dimensions 212-3FB**

Housingsize (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			190
½ x 1			27	18		250
1 x 1			27			300
1 x 2			51	30		450
1 x 3			75			590
2 x 1			27			535
2 x 2		12	51	60	38	800
2 x 3			75			1045
3 x 1			27			770
3 x 2			51	90		1145
3 x 3			75			1500
4 x 1			27			1010
4 x 2			51	120		1495
4 x 3			75			1950

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

**Housings (Containment)**  
**Dimensions 216-3FB**

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			200
½ x 1			27	18		265
1 x 1			27			320
1 x 2			51	30		480
1 x 3			75			630
2 x 1			27			575
2 x 2		16	51	60	42	850
2 x 3	75		1110			
3 x 1	27		825			
3 x 2	51		90	1220		
3 x 3			75			1585
4 x 1			27			1080
4 x 2			51	120		1590
4 x 3			75			2065

**Dimensions 218-3FB**

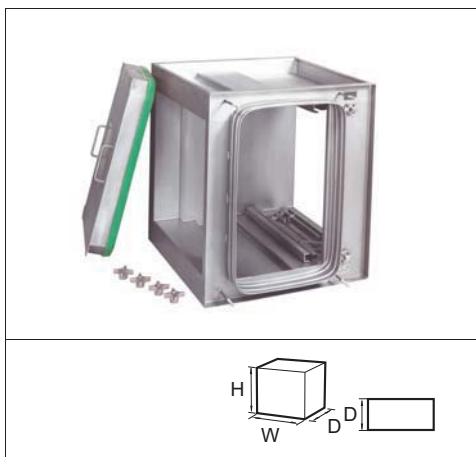
Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			210
½ x 1			27	18		275
1 x 1			27			330
1 x 2			51	30		495
1 x 3			75			650
2 x 1			27			590
2 x 2		18	51	60	44	870
2 x 3	75		1140			
3 x 1	27		850			
3 x 2	51		90	1250		
3 x 3			75			1630
4 x 1			27			1110
4 x 2			51	120		1630
4 x 3			75			2115

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# CamContain™ GB Housing (gasket seal)



## Advantages

- Positive sealing integrity in a side access bag-in/bag-out housing for gasket seal Absolute® filters
- 1400 pounds of gasket-sealing pressure ensures complete capture of airborne contaminants

**Typical applications:** Chemical manufacturing facilities, food processing, genetic research and biotechnology facilities, hospital isolation suites to prevent the spread of infectious diseases, industrial processes exhaust, microelectronic and semiconductor facilities, nuclear power plants, pharmaceutical facilities, radioisotope handling facilities, university research laboratories, US Department of Energy Facilities, veterinary research and animal disease laboratories, and specific United States Government and military facilities.

**Construction:** Containment level housing. See Product Sheet 3402 for construction details.

**Filters:** Gasket seal Absolute® filters or HEGA filters.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection can be accomplished.

Consult factory or Literature 3402 for more information.

## Dimensions 012-1GB

Housing Size (H x W)	Pre-filter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
1 x 1	N/A		27			230
1 x 2	N/A		51	30		345
1 x 3	N/A		75			460
2 x 1	N/A		27			410
2 x 2	N/A		51	60		615
2 x 3	N/A		75			805
3 x 1	N/A	12	27		26	590
3 x 2	N/A		51	90		880
3 x 3	N/A		75			1150
4 x 1	N/A		27			765
4 x 2	N/A		51	120		1145
4 x 3	N/A		75			1497

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

Housings (Containment)

Dimensions 016-1GB

Housingsize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	N/A		15			135
½ x 1			27	18		175
1 x 1			27			210
1 x 2			51	30		320
1 x 3			75			425
2 x 1			27			375
2 x 2		16	51	60	26	570
2 x 3	75		745			
3 x 1	27		540			
3 x 2	51		90	815		
3 x 3			75			1170
4 x 1			27			700
4 x 2			51	120		1060
4 x 3			75			1390

Dimensions 018-1GB

Housingsize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			155
½ x 1			27	18		205
1 x 1			27			245
1 x 2			51	30		370
1 x 3			75			485
2 x 1			27			435
2 x 2	N/A	18	51	60	33	645
2 x 3			75	850		
3 x 1			27	625		
3 x 2			51	90		930
3 x 3			75			1210
4 x 1			27			815
4 x 2			51	120		1210
4 x 3			75			1575

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**Housings (Containment)**  
**Dimensions 212-1GB**

Housingsize (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			135
½ x 1			27	18		175
1 x 1			27			210
1 x 2			51	30		320
1 x 3			75			425
2 x 1			27			375
2 x 2	2	12	51	60	33	570
2 x 3			75			745
3 x 1			27			540
3 x 2			51	90		815
3 x 3			75			1070
4 x 1			27			700
4 x 2			51	120		1060
4 x 3			75			1390

**Dimensions 216-1GB**

Housingsize (H x W)	Prefilter depth (inches)	Primary Filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			145
½ x 1			27	18		195
1 x 1			27			230
1 x 2			51	30		345
1 x 3			75			460
2 x 1			27			410
2 x 2	2	16	51	60	34	615
2 x 3			75			805
3 x 1			27			590
3 x 2			51	90		880
3 x 3			75			1150
4 x 1			27			765
4 x 2			51	120		1145
4 x 3			75			1497

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.



Housings (Containment)

Dimensions 218-1GB

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½			15			155
½ x 1			27	18		205
1 x 1			27			245
1 x 2			51	30		370
1 x 3			75			485
2 x 1			27			435
2 x 2	2	18	51	60	36	645
2 x 3			75			850
3 x 1			27			625
3 x 2			51	90		930
3 x 3			75			1210
4 x 1			27			815
4 x 2			51	120		1210
4 x 3			75			1575

Dimensions 212-3GB

Housing size (H x W)	Prefilter depth (inches)	Primary filter depth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			190
½ x 1			27	18		250
1 x 1			27			300
1 x 2			51	30		450
1 x 3			75			590
2 x 1			27			535
2 x 2		12	51	60	38	800
2 x 3			75			1045
3 x 1			27			770
3 x 2			51	90		1145
3 x 3			75			1500
4 x 1			27			1010
4 x 2			51	120		1495
4 x 3			75			1950

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**Housings (Containment)**  
**Dimensions 216-3GB**

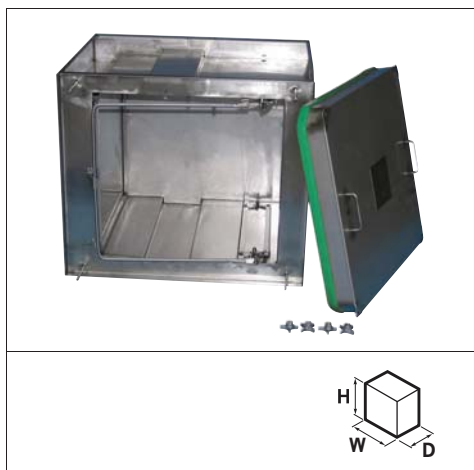
Housingsize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			200
½ x 1			27	18		265
1 x 1			27			320
1 x 2			51	30		480
1 x 3			75			630
2 x 1			27			575
2 x 2		16	51	60	42	850
2 x 3	75		1110			
3 x 1	27		825			
3 x 2	51		1220			
3 x 3			75			1585
4 x 1			27			1080
4 x 2			51	120		1590
4 x 3			75			2065

**Dimensions 218-3GB**

Housingsize (H x W)	Prefilter depth (inches)	Primaryfilterdepth (inches)	Housing depth (inches)	Housing height (inches)	Housing width (inches)	Weight
½ x ½	2, 4 or 6		15			210
½ x 1			27	18		275
1 x 1			27			330
1 x 2			51	30		495
1 x 3			75			650
2 x 1			27			590
2 x 2		18	51	60	44	870
2 x 3	75		1140			
3 x 1	27		850			
3 x 2	51		1250			
3 x 3			75			1630
4 x 1			27			1110
4 x 2			51	120		1630
4 x 3			75			2115

As part of our program for continuous improvement, Camfil reserves the right to change specifications without notice.

# CamContain™ FN Housing (fluid seal)



## Advantages

- Positive sealing integrity in a side access containment housing for fluid seal Absolute® filters
- Designed for processes that use a decontamination procedure during filter change

**Typical applications:** Chemical manufacturing facilities, food processing, genetic research and biotechnology facilities, hospital isolation suites to prevent the spread of infectious diseases, industrial processes exhaust, microelectronic and semiconductor facilities, nuclear power plants, pharmaceutical facilities, radioisotope handling facilities, university research laboratories, US Department of Energy facilities, veterinary research and animal disease laboratories, and specific United States Government and military facilities.

**Construction:** Containment level housing designed for filter decontamination at filter change. See Product Sheet 3405 for construction details.

**Filters:** Gasket seal Absolute® filters or HEGA filters.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection can be accomplished.

## Dimensions

Housing Size (H x W)	Prefilter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)		
Housing Size/Configuration Chart - 012-1FN							
½ x ½	N/A	12	15	26	120		
½ x 1	N/A		27		160		
1 x 1	N/A		27		190		
1 x 2	N/A		51		290		
1 x 3	N/A		75		385		
2 x 1	N/A		27		340		
2 x 2	N/A		51		510		
2 x 3	N/A		75		670		
3 x 1	N/A		27		485		
3 x 2	N/A		51		725		
3 x 3	N/A		75		950		
4 x 1	N/A		27		630		
4 x 2	N/A		51		940		
4 x 3	N/A		75		1230		
Housing Size/Configuration Chart - 016-1FN							

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Housings (Containment)

Housing Size (H x W)	Prefilter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
½ x ½	N/A	16	15	30	135
½ x 1	N/A		27		175
1 x 1	N/A		27		210
1 x 2	N/A		51		320
1 x 3	N/A		75		420
2 x 1	N/A		27		370
2 x 2	N/A		51		550
2 x 3	N/A		75		725
3 x 1	N/A		27		530
3 x 2	N/A		51		785
3 x 3	N/A		75		1030
4 x 1	N/A		27		690
4 x 2	N/A		51		1020
4 x 3	N/A		75		1340

Housing Size/Configuration Chart - 018-1FN

½ x ½	N/A	18	15	33	145
½ x 1	N/A		27		190
1 x 1	N/A		27		225
1 x 2	N/A		51		340
1 x 3	N/A		75		445
2 x 1	N/A		27		395
2 x 2	N/A		51		585
2 x 3	N/A		75		770
3 x 1	N/A		27		565
3 x 2	N/A		51		835
3 x 3	N/A		75		1090
4 x 1	N/A		27		735
4 x 2	N/A		51		1080
4 x 3	N/A		75		1410

Housing Size/Configuration Chart - 212-1FN

½ x ½	2	12	15	26	138
½ x 1			27		181
1 x 1			27		218
1 x 2			51		330
1 x 3			75		434
2 x 1			27		3385
2 x 2			51		5578
2 x 3			75		754
3 x 1			27		5552
3 x 2			51		826
3 x 3			75		1074
4 x 1			27		720
4 x 2			51		1073
4 x 3			75		1394

Housing Size/Configuration Chart - 216-1FN

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Housings (Containment)

Housing Size (H x W)	Prefilter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
1/2 x 1/2	2	16	15	34	150
1/2 x 1			27		198
1 x 1			27		237
1 x 2			51		371
1 x 3			75		489
2 x 1			27		549
2 x 2			51		747
2 x 3			75		839
3 x 1			27		599
3 x 2			51		929
3 x 3			75		1214
4 x 1			27		780
4 x 2			51		1280
4 x 3			75		1577

Housing Size/Configuration Chart - 218-1FN

1/2 x 1/2	2	18	15	36	157
1/2 x 1			27		206
1 x 1			27		247
1 x 2			51		411
1 x 3			75		547
2 x 1			27		435
2 x 2			51		725
2 x 3			75		960
3 x 1			27		623
3 x 2			51		1040
3 x 3			75		1374
4 x 1			27		811
4 x 2			51		1335
4 x 3			75		1787

Housing Size/Configuration Chart - 212-3FN

1/2 x 1/2	2,4,6	12	15	38	175
1/2 x 1			27		230
1 x 1			27		275
1 x 2			51		410
1 x 3			75		540
2 x 1			27		485
2 x 2			51		715
2 x 3			75		940
3 x 1			27		695
3 x 2			51		1020
3 x 3			75		1340
4 x 1			27		905
4 x 2			51		1330
4 x 3			75		1740

Housing Size/Configuration Chart - 216-3FN



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**Housings (Containment)**

Housing Size (H x W)	Pre-filter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
½ x ½			15		185
½ x 1			27		245
1 x 1			27		290
1 x 2			51		435
1 x 3			75		575
2 x 1			27		520
2 x 2	2,4,6	16	51	42	760
2 x 3			75		1000
3 x 1			27		740
3 x 2			51		1085
3 x 3			75		1420
4 x 1			27		970
4 x 2			51		1410
4 x 3			75		1845

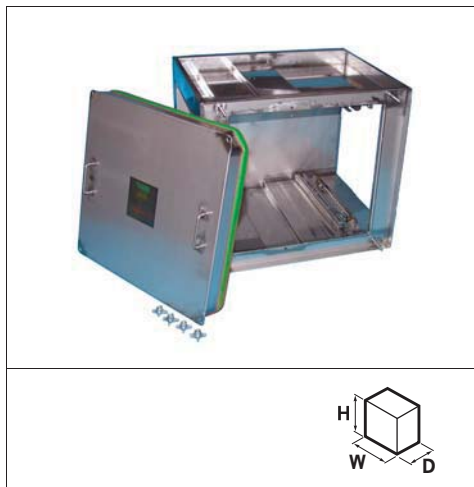
Housing Size/Configuration Chart - 218-3FN

½ x ½	2,4,6	18	15	44	192
½ x 1			27		252
1 x 1			27		302
1 x 2			51		448
1 x 3			75		593
2 x 1			27		534
2 x 2			51		782
2 x 3			75		1027
3 x 1			27		765
3 x 2			51		1115
3 x 3			75		1461
4 x 1			27		997
4 x 2			51		1449
4 x 3			75		1895

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# CamContain™ GN Housing (gasket seal)



## Advantages

- Positive sealing integrity in a side access bag-in/bag-out housing for gasket seal Absolute® filters
- 1400 pounds of gasket-sealing pressure ensures complete capture of airborne contaminants. Designed for processes that use a decontamination procedure during filter change

**Typical applications:** Chemical manufacturing facilities, food processing, genetic research and biotechnology facilities, hospital isolation suites to prevent the spread of infectious diseases, industrial processes exhaust, microelectronic and semiconductor facilities, nuclear power plants, pharmaceutical facilities, radioisotope handling facilities, university research laboratories, US Department of Energy Facilities, veterinary research and animal disease laboratories, and specific United States Government and military facilities.

**Construction:** Containment level housing designed for filter decontamination at filter change. See Product Sheet 3405 for construction details.

**Filters:** Gasket seal Absolute® filters or HEGA filters. Designed for processes that use a decontamination procedure during filter change.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection can be accomplished.

## Dimensions

Housing Size (H x W)	Prefilter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
Housing Size/Configuration Chart - 012-1GN					
½ x ½	N/A		15		125
½ x 1	N/A		27		165
1 x 1	N/A		27		198
1 x 2	N/A		51		305
1 x 3	N/A		75		410
2 x 1	N/A		27		350
2 x 2	N/A		51		540
2 x 3	N/A	12	75	26	720
3 x 1	N/A		27		500
3 x 2	N/A		51		770
3 x 3	N/A		75		1030
4 x 1	N/A		27		650
4 x 2	N/A		51		1000
4 x 3	N/A		75		1335
Housing Size/Configuration Chart - 016-1GN					



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Housings (Containment)

Housing Size (H x W)	Pre-filter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
½ x ½	N/A	16	15	30	135
½ x 1	N/A		27		180
1 x 1	N/A		27		215
1 x 2	N/A		51		330
1 x 3	N/A		75		445
2 x 1	N/A		27		380
2 x 2	N/A		51		580
2 x 3	N/A		75		780
3 x 1	N/A		27		545
3 x 2	N/A		51		830
3 x 3	N/A		75		1110
4 x 1	N/A		27		710
4 x 2	N/A		51		1080
4 x 3	N/A		75		1440

Housing Size/Configuration Chart - 018-1GN

½ x ½	N/A	18	15	33	145
½ x 1	N/A		27		195
1 x 1	N/A		27		230
1 x 2	N/A		51		350
1 x 3	N/A		75		470
2 x 1	N/A		27		400
2 x 2	N/A		51		615
2 x 3	N/A		75		820
3 x 1	N/A		27		615
3 x 2	N/A		51		575
3 x 3	N/A		75		1165
4 x 1	N/A		27		750
4 x 2	N/A		51		1140
4 x 3	N/A		75		1510

Housing Size/Configuration Chart - 212-1GN

½ x ½	2	12	15	26	125
½ x 1			27		165
1 x 1			27		195
1 x 2			51		305
1 x 3			75		410
2 x 1			27		350
2 x 2			51		540
2 x 3			75		720
3 x 1			27		500
3 x 2			51		770
3 x 3			75		1030
4 x 1			27		650
4 x 2			51		1000
4 x 3			75		1335

Housing Size/Configuration Chart - 216-1GN

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**Housings (Containment)**

Housing Size (H x W)	Prefilter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
½ x ½	2	16	15	30	185
½ x 1			27		180
1 x 1			27		215
1 x 2			51		330
1 x 3			75		445
2 x 1			27		380
2 x 2			51		580
2 x 3			75		780
3 x 1			27		545
3 x 2			51		830
3 x 3			75		1110
4 x 1			27		710
4 x 2			51		1080
4 x 3			75		1440

Housing Size/Configuration Chart - 218-1GN

½ x ½	2	18	15	33	145
½ x 1			27		195
1 x 1			27		230
1 x 2			51		350
1 x 3			75		470
2 x 1			27		400
2 x 2			51		615
2 x 3			75		820
3 x 1			27		575
3 x 2			51		875
3 x 3			75		1165
4 x 1			27		750
4 x 2			51		1140
4 x 3			75		1510

Housing Size/Configuration Chart - 212-3GN

½ x ½	2,4,6	12	15	38	175
½ x 1			27		230
1 x 1			27		275
1 x 2			51		425
1 x 3			75		570
2 x 1			27		490
2 x 2			51		745
2 x 3			75		1000
3 x 1			27		705
3 x 2			51		1070
3 x 3			75		1430
4 x 1			27		920
4 x 2			51		1390
4 x 3			75		1860

Housing Size/Configuration Chart - 216-3GN



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Housings (Containment)

Housing Size (H x W)	Pre-filter Depth (inches)	Primary Filter Depth (inches)	Height (inches)	Width (inches)	Weight (lbs)
½ x ½			15		185
½ x 1			27		250
1 x 1			27		295
1 x 2			51		450
1 x 3			75		605
2 x 1			27		525
2 x 2	2,4,6	16	51	42	790
2 x 3			75		1060
3 x 1			27		750
3 x 2			51		1135
3 x 3			75		1510
4 x 1			27		980
4 x 2			51		1475
4 x 3			75		1965

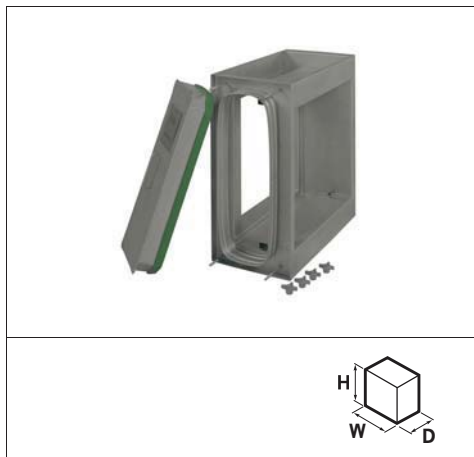
Housing Size/Configuration Chart - 218-3GN

½ x ½	2,4,6	18	15	44	190
½ x 1			27		255
1 x 1			27		305
1 x 2			51		465
1 x 3			75		620
2 x 1			27		535
2 x 2			51		810
2 x 3			75		1085
3 x 1			27		770
3 x 2			51		1160
3 x 3			75		1545
4 x 1			27		1005
4 x 2			51		1510
4 x 3			75		2010

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# CamContain™ PB Prefilter Housing



## Advantages

- Accepts 2", 4" or 6" ASHRAE grade prefilters to extend the life of Absolute® or HEGA filters
- PB Series 212 allows the installation of a 2" prefilter and a 12" secondary filter

**Typical applications:** Single or two-stage filter housing designed for mating with Absolute® or HEGA bag-in/bag-out housings. Housing includes a bagging flange for use with a containment bag to facilitate safe filter change by service personnel.

**Construction:** 14-gauge and 11-gauge T304 and 316 stainless steel.

**Filters:** 2", 4" or 6" prefilters, or a 2" prefilter and a 12" deep secondary filter of ASHRAE grade efficiency.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection can be accomplished.

Consult factory or Literature 3403 for more information.

Housing Size (H x W)	Prefilter Depth (inches)	Height (inches)	Width (inches)	Depth (inches)	Shipping Weight (lbs)
½ x ½	2, 4, or 6	18	15	14	85
½ x 1		18	27		110
1 x 1		30	27		130
1 x 2		30	51		190
1 x 3		30	75		245
2 x 1		60	27		230
2 x 2		60	51		330
2 x 3		60	75		425
3 x 1		90	27		335
3 x 2		90	51		470
3 x 3		90	75		605
4 x 1		120	27		435
4 x 2		120	51		610
4 x 3		120	75		785

Housing Size (H x W)	Prefilter Depth (inches)	Secondary Filter Depth (inches)	Height (inches)	Width (inches)	Depth (inches)	Shipping Weight (lbs)
½ x ½	2	12	18	15	26	125
½ x 1			18	27		160
1 x 1			30	27		195
1 x 2			30	51		295
1 x 3			30	75		385
2 x 1			60	27		345
2 x 2			60	51		515
2 x 3			60	75		670
3 x 1			90	27		495
3 x 2			90	51		740
3 x 3			90	75		955
4 x 1			120	27		645
4 x 2			120	51		960
4 x 3			120	75		1240

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# CamContain™ FB-R Round Housing



## Advantages

- Positive sealing integrity in a round top access bag-in/bag-out housing for fluid seal Absolute® or HEGA filters
- Complete capture of airborne contaminants

**Typical applications:** Chemical manufacturing facilities, food processing, genetic research and biotechnology facilities, hospital isolation suites to prevent the spread of infectious diseases, industrial processes exhaust, microelectronic and semiconductor facilities, nuclear power plants, pharmaceutical facilities, radioisotope handling facilities, university research laboratories, US Department of Energy facilities, veterinary research and animal disease laboratories, and specific United States Government and military facilities.

**Construction:** Containment level bag-in/bag-out round housing.

**Filters:** Fluid seal Absolute® filters or HEGA filters.

**Additional data:** Information shown herein for quick reference purposes only.

Consult factory or Literature 3408 for more information.

Standard Model Number	Primary Filter Dimensions (inches)	Adsorber Size (inches)	Rated Airflow (cfm)	Actual Height (inches)	Actual Diameter (inches)	Weight (lbs.)
FB-R -12 - 12P - SS	12 X 12 X 11-½	N/A	250	29	18-¼	150
FB-R -24 - 12P - SS	24 X 24 X 11-½	N/A	1000	29	36-¼	245
FB-R - 24 - 16C - SS	N/A	24 X 24 X 16-¾	1000	34	36-¼	265
FB-R -24 - 18C - SS	N/A	24 X 24 X 18-¾	1250	36	36-¼	265

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# CamContain™ Test Sections



## Advantages

- Available for upstream, downstream, overall efficiency and scan-required efficiency applications
- Service personnel are protected during the scanning process

**Typical applications:** Mate directly to Camfil containment level filter housings to allow testing-in-place of Absolute® filters without compromising service personnel.

**Construction:** 14-gauge and 11-gauge T304/316 stainless steel.

**Additional data:** Information shown herein for quick reference purposes only. Application specific data is required by the factory before model selection and mating with containment housing can be accomplished.

Consult factory or Literature 3407 for more information.

## Dimensions

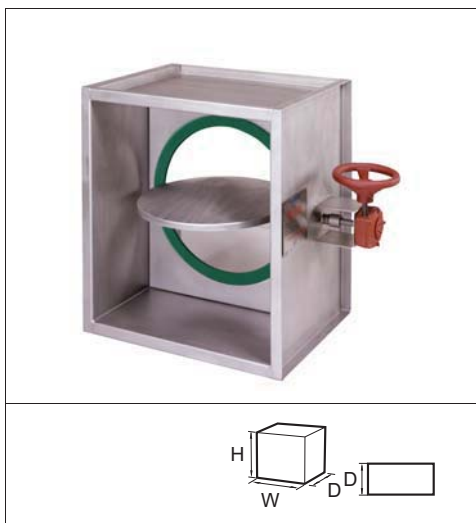
Size s (H x W)	Port s	TSU/TSC Upstream Test Sections				PTSU Accurate Scan Test Sections				Port s	TSD Test Sections				ASTS Accurate Scan Test Sections			
		Heigh t (inche s)	Width (inche s)	Lengt h (inche s)	Weigh t (lbs)	Heigh t (inche s)	Width (inche s)	Lengt h (inche s)	Weigh t (lbs)		Heigh t (inche s)	Width (inche s)	Lengt h (inche s)	Weigh t (lbs)	Heigh t (inche s)	Width (inche s)	Lengt h (inche s)	Weigh t (lbs)
1 x 1	1,1	30	27	28	215	30	27	40	310	1	30	27	22	165	30	27	26	185
1 x 2	2,2	30	51	28	360	30	51	40	515	2	30	51	22	270	30	51	26	275
1 x 3	3,3	30	75	28	505	30	75	40	710	3	30	75	22	375	30	75	26	360
2 x 1	2,2	60	27	28	380	60	27	40	555	2	60	27	22	285	60	27	26	330
2 x 2	4,4	60	51	28	645	60	51	40	915	4	60	51	22	480	60	51	26	480
2 x 3	6,6	60	75	28	900	60	75	40	1265	6	60	75	22	660	60	75	26	620
3 x 1	3,3	90	27	28	545	90	27	40	800	3	90	27	22	410	90	27	26	470
3 x 2	6,6	90	51	28	930	90	51	40	1320	6	90	51	22	685	90	51	26	680
3 x 3	9,9	90	75	28	1295	90	75	40	1825	9	90	75	22	945	90	75	26	875
4 x 1	4,4	120	27	28	710	120	27	40	1040	4	120	27	22	535	120	27	26	610
4 x 2	8,8	120	51	28	1210	120	51	40	1720	8	120	51	22	895	120	51	26	885
4 x 3	12,12	120	75	28	1690	120	75	40	2380	12	120	75	22	1230	120	75	26	1135

Upstream test sections provide one port for injection, and one port for upstream concentration, for each filter wide. Combination test sections provide one port for injection, and one port for concentration sampling, for each filter wide. (sampling port used for upstream and downstream concentrations, depending on which filter is being tested.) Downstream test sections provide one port for downstream concentrations, for each filter wide.



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# CamContain™ SBDT Isolation Dampers (rectangular)



## Advantages

- Create a barrier between hazardous contaminants and filter changeout components typical to a containment system
- Isolate contaminated filters and protect service personnel

**Typical applications:** Isolate filters and contaminated components in bag-in/bag-out systems.

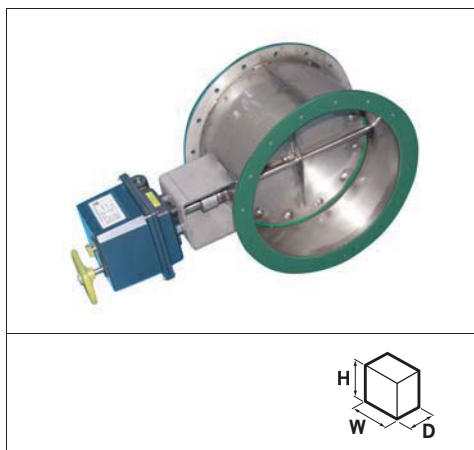
**Construction:** 14 and 11-gauge T304 or 316 stainless steel. 20" round damper dish provides a positive seal to 10" w.g.

**Additional data:** Consult factory or Literature 3440S for additional detail.

Model Number	Nominal Dish Size (inches)	Height (inches)	Width (inches)	Depth (inches)	Maximum Width (inches)	Approx. Weight (lbs.)
CF - 1 x 1 - BTD - 20 - M - SS	20	30	27	20	37	94
CF - 1 x 2 - BTD - 20 - M - SS		30	51	20	61	189
CF - 1 x 3 - BTD - 20 - M - SS		30	75	20	85	283
CF - 2 x 1 - BTD - 20 - M - SS		60	27	20	37	188
CF - 2 x 2 - BTD - 20 - M - SS		60	51	20	61	378
CF - 2 x 3 - BTD - 20 - M - SS		60	75	20	85	566
CF - 3 x 1 - BTD - 20 - M - SS		90	27	20	37	282
CF - 3 x 2 - BTD - 20 - M - SS		90	51	20	61	567
CF - 3 x 3 - BTD - 20 - M - SS		90	75	20	85	849
CF - 4 x 1 - BTD - 20 - M - SS		120	27	20	37	376
CF - 4 x 2 - BTD - 20 - M - SS		120	51	20	61	756
CF - 4 x 3 - BTD - 20 - M - SS		120	75	20	85	1132

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# CamContain™ BTFB Isolation Dampers (round)



## Advantages

- Create a barrier between hazardous contaminants and filter changeout components typical to a containment system
- Isolate contaminated filters and protect service personnel

**Typical applications:** Isolate filters and contaminated components in bag-in/bag-out systems.

**Construction:** 11 and 7-gauge T304/316 stainless steel. 20" round damper dish provides a positive seal to 10" w.g. Available as low-leak or bubble-tight. Available in sizes from 6" to 32" in 2" increments.

**Additional data:** Consult factory or Literature 3440R for additional detail.

Model Number	Flange I.D. (inches)	Flange O.D. (inches)	Bolt Circle	Number of Bolt Holes	Bolt Hole Diameter (inches)	Weight (lbs.)
CF - BT- FB - 6 - M - SS	6	9	7-½	8	7/16	35
CF - BT- FB - 8 - M - SS	8	11	9-½	8		45
CF - BT- FB - 10 - M - SS	10	13	11-½	12		50
CF - BT- FB - 12 - M - SS	12	15	13-½	12		60
CF - BT- FB - 14 - M - SS	14	17	15-½	16		70
CF - BT- FB - 16 - M - SS	16	19	17-½	16		80
CF - BT- FB - 18 - M - SS	18	21	19-½	16		90
CF - BT- FB - 20 - M - SS	20	23	21-½	20		100
CF - BT- FB - 22 - M - SS	22	25	23-½	20		115
CF - BT- FB - 24 - M - SS	24	27	25-½	24		130
CF - BT- FB - 26 - M - SS	26	29	27-½	24		140
CF - BT- FB - 28 - M - SS	28	31	29-½	28		155
CF - BT- FB - 30 - M - SS	30	33	31-½	28		170
CF - BT- FB - 32 - M2 - SS	32	35	33-½	32		190

SS may also be replaced with 316SS.

Standard damper includes a manual handwheel actuator. There are many options when considering electric or pneumatic actuators. Some include solenoid valves and switches. Contact factory for assistance.

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# Self-Contained Systems



## Advantages

- Complete self-contained air filtration systems for removal of hazardous contaminants
- Performance matched and optimized components

**Typical applications:** Hospital isolation rooms/wards and Intensive Care Units (ICUs) for the control of airborne pathogens, viral contaminants and infectious organisms.

**Construction:** Matched components can include bag-in/bag-out section, prefilter section, testing section and optimized fan section.

**Filters:** Absolute® filters and various grades of ASHRAE grade filters for prefiltration.

**Additional data:** Consult factory or Literature 3409 for additional information.

Standard Model Number	Number of Prefilters	Prefilter Size (nominal)	Number of Primary Filters	Primary Filter Dimensions	Rated Airflow
½ X 1 -212-1GB-SS-SC-500	1	12 X 24 X 2	1	12 X 24 X 12	500
1 X 1 -212-1GB-SS-SC-1000	1	24 X 24 X 2	1	24 X 24 X 12	1000
1 X 1 -212-1GB-SS-SC-1500	1	24 X 24 X 2	1	24 X 24 X 12	1500
1 X 2 -212-1GB-SS-SC-2000	2	24 X 24 X 2	2	24 X 24 X 12	2000
1 X 2 -212-1GB-SS-SC-3000	2	24 X 24 X 2	2	24 X 24 X 12	3000
1 X 2 -212-1GB-SS-SC-4000	2	24 X 24 X 2	2	24 X 24 X 12	4000

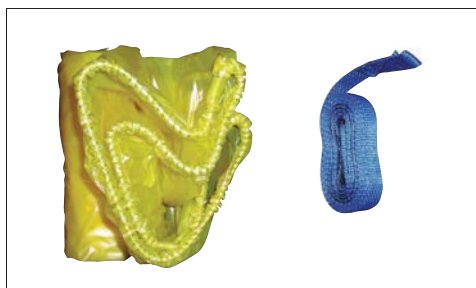
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## Bags & Accessories

### Advantages

- **Manufactured under the same quality assurance criteria as our containment housings**



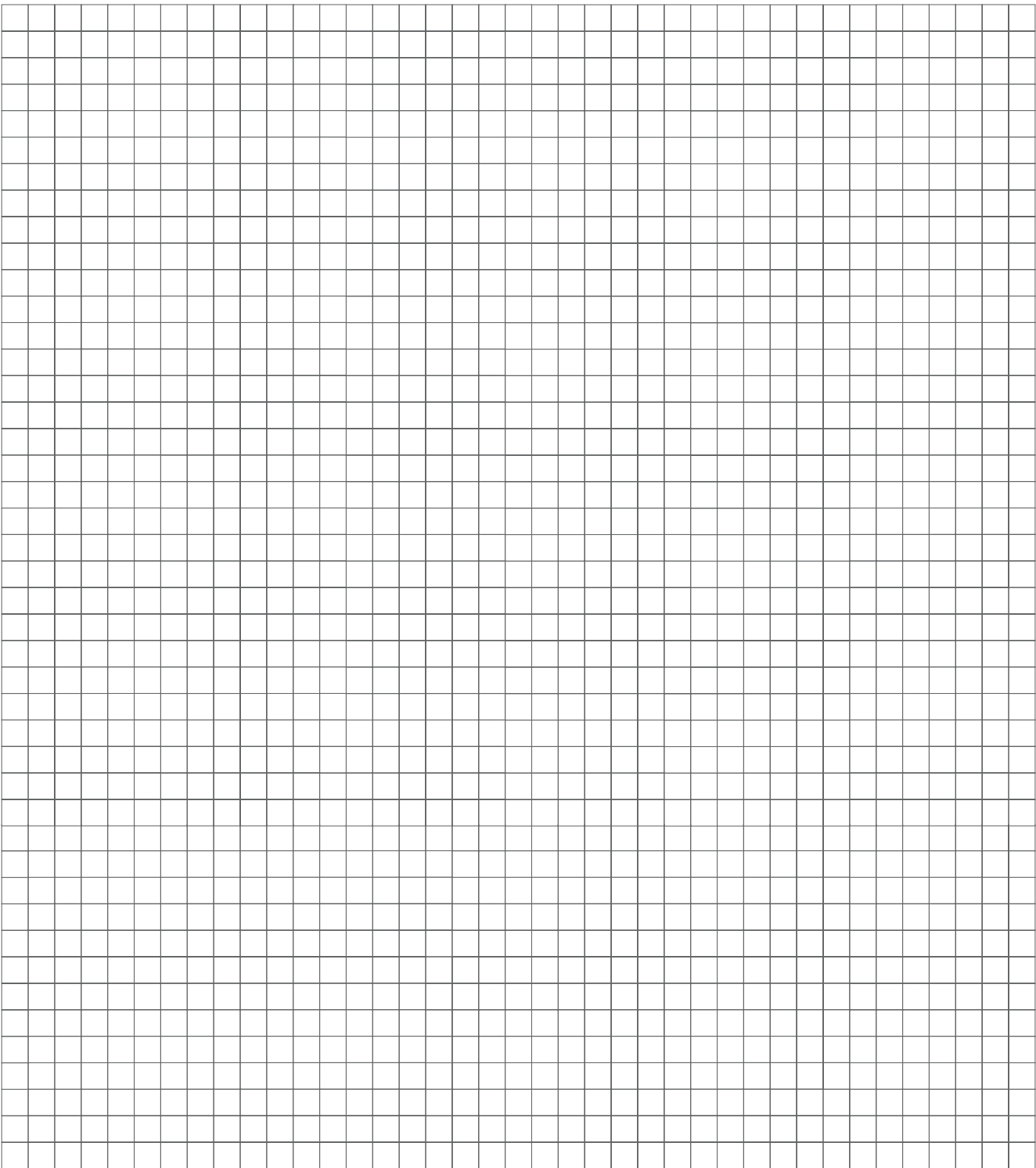
- Change-out bags
- Security straps



- Bag-out change support shelf



- Banding kit includes all of the tools required to do a change

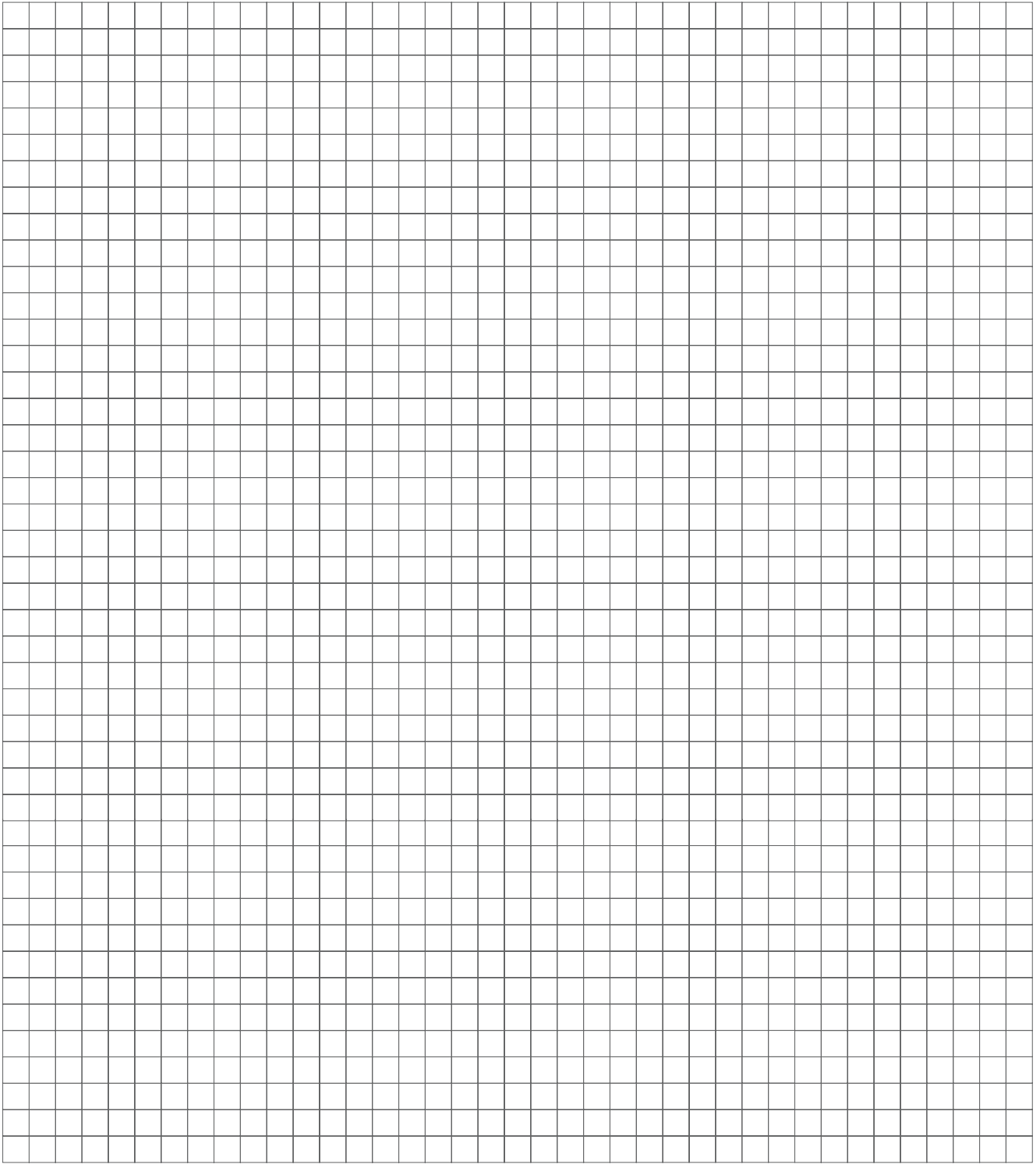


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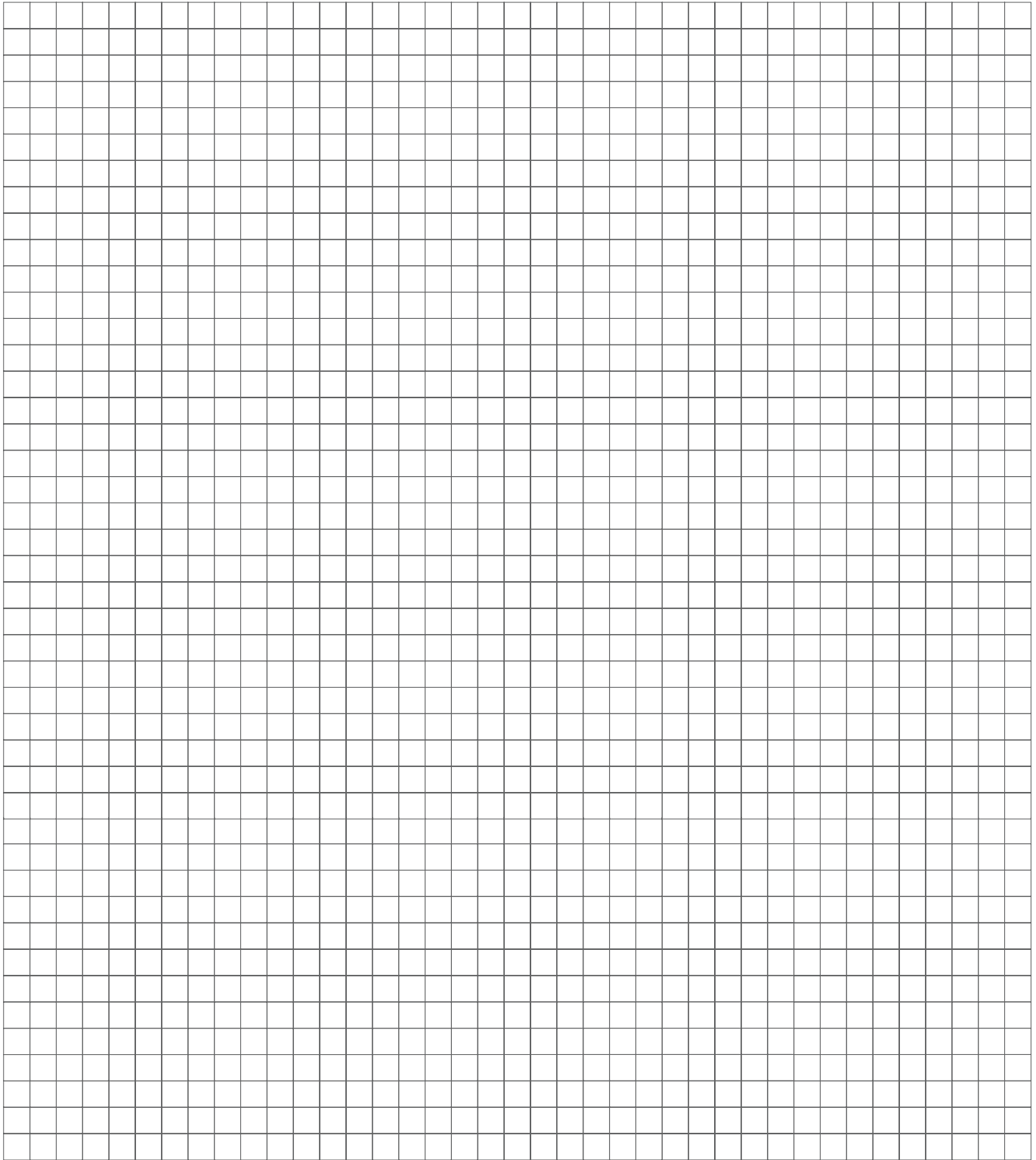
Conover NC, Corcoran CA, Crystal Lake IL, Riverdale NJ,  
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Camfil participates in various industry supportive guideline/standard creating bodies to ensure that the air filtration industry advances for the benefit of those that we serve. This page includes a partial list of the organizations we participate in, with their doctrine listed with their logo. We have also included their web site address for those that would like additional information related to that organization.

### **United States Green Building Council (USGBC)**

To transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life.

[www.usgbc.org](http://www.usgbc.org)



### **United States Environmental Protection Agency (EPA) Energy Star Partner**

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

[www.energystar.gov/](http://www.energystar.gov/)



Camfil supports the efforts of our employees as individual members of the following organizations that seek to improve environments for people and processes throughout the world.



### **The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE)**

The American Society of Heating, Refrigerating and Air-Conditioning Engineers advances technology to serve humanity and promote a sustainable world. Membership is open to any person associated with the field.

[www.ashrae.org](http://www.ashrae.org)



### **Institutes of Environmental Sciences & Technology (IEST)**

The Institute of Environmental Sciences and Technology (IEST), founded in 1953, is a multi-disciplinary, international society whose members are internationally recognized for their contributions to the environmental sciences in the areas of contamination control in electronics manufacturing and pharmaceutical processes; design, test, and evaluation of commercial and military equipment; and product reliability issues associated with commercial and military systems.

[www.iest.org](http://www.iest.org)



### **European Committee for Standardization**

CEN, was founded in 1961 by the national standards bodies in the European Economic Community and EFTA countries. Now CEN is contributing to the objectives of the European Union and European Economic Area with voluntary technical standards, which promote free trade, the safety of workers and consumers, interoperability of networks, environmental protection, exploitation of research and development programs, and public procurement.

[www.cen.eu](http://www.cen.eu)

### **International Organization for Standardization**

ISO standards add value to all types of business operations. They contribute to making the development, manufacturing and supply of products and services more efficient, safer and cleaner. They make trade between countries easier and fairer. ISO standards also serve to safeguard consumers and users of products and services in general - as well as making their lives simpler.

[www.iso.org](http://www.iso.org)





Commitment to quality...

...Camfil is the leader in clean air technology and air filter protection.

Camfil has its own product development, R&D and worldwide local representation.

Our overall quality goal is to develop, produce and market products and services of such a quality that we aim to exceed our customers expectations.

We see our activities and products as an expression of our quality.

To reach a level of total quality, it is necessary to establish an internal work environment where all Camfil employees can succeed together. This means an environment characterized by openness, confidence and good business understanding.

[www.camfil.com](http://www.camfil.com)

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### North American Manufacturing Locations

Concord, Ontario    Conover, North Carolina    Corcoran, California    Crystal Lake, Illinois  
Riverdale, New Jersey    Washington, North Carolina

### Worldwide Manufacturing Locations

China    France    Germany    Ireland    Malaysia    Slovakia    Sweden    Switzerland    United Kingdom