

product catalogue

Camfil Farr	Air Filter Products and Services
Air Filtration Solutions - Asia Pacific & Middle East	
Camfil Farr – clean air solutions	





Camfil Farr - Ipoh, Malaysia plant.



Camfil Farr - Kunshan, China plant.

Dear Customer:

We are happy to provide this latest edition of the Camfil Farr Product Catalogue.

We've tried to make it easy to use and have included extensive product information, application guides and reference tools to simplify the selection of the right Camfil Farr Clean Air Solution. This catalogue along with additional application specific information is also on the enclosed CD.

Camfil Farr is a Clean Air Solution provider to the world, our product range includes many industry benchmark filters. Already a market leader in Europe and North America, growing Camfil Farr investments have made us the fastest growing Clean Air Solution provider in Asia. Building on our strength of in-house process development, continuous product R&D and global purchasing power Camfil Farr operates multiple factories and an extensive sales network dedicated to the support of our valued customers in Asia. We have also developed a wide range of technical support tools including software packages that can assist in Life Cycle Cost evaluation, Clean Room design, Filter Performance Data and Chemical Filter Selection.

We are also proud to be helping our customers become more environmentally friendly. Our R&D efforts are focused on developing sustainable solutions that take into account complete product life cycles. For a customer using high performance Camfil Farr products this translates into reduced energy consumption and lower operating costs. This is good for our customers and for the planet.

If you would like more information about any of these programs, please contact your local Camfil Farr Sales Office or Distributor.

Alternatively, you can visit our website at www.camfilfarr.com.

We are pleased to offer this wide range of Clean Air Solutions, please enjoy your reading.

Phil Whitaker
President,
Camfil Farr Asia & Middle East.



ALL HEPA/ULPA filters are individually tested according to EN 1822



Production in controlled environment



All plants are ISO 9000 certified



Advanced molecular filter production



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Quick Selection Guide

		Filter Grade		Air Filter Selection					
Primary Filtration	Medium Efficiency	Primary Filters	ASHRAE 52.2 - 2007	MERV 2 - 4 MERV 5 - 6 MERV 7 - 9	EN 779 : 2002	Primary Filters		   	
						G2 ≥ 65% G3 ≥ 80% G4 ≥ 90% EN 779:2002 Average Arrestance			
Filtration for Air Conditioning Systems. Pre-filtration for EPA/HEPA/ULPA Filters	High Efficiency	Fine Filters 	ASHRAE 52.2 - 2007	MERV 10 MERV 11-12 MERV 13 MERV 14 MERV 15	EN 779 : 2002	Fine Filters		   	
						F5 ≥ 40% F6 ≥ 60% F7 ≥ 80% F8 90% F9 95% EN 779:2002 efficiency			
Final Filters / Clean Room Filters	Very High Efficiency	ULPA HEPA EPA	DOP 0.3um	IV 95% IV 99,9% IV 99,97% IV 99,99% IV 99,999%	EN 1822 : 2009	MPPS (Most Penetrating Particle Size)		   	
						E10 85% E11 95% E12 99,5% H13 99,95% H14 99,995% U15 99,9995% U16 99,99995% U17 99,999995%			
Molecular						CityFlo, CitySorb, CityCarb, CamCarb		 	
Frames, housings & speciality filters	    					Filter Housings, Camseal FC Casings, Type 8 Frames			

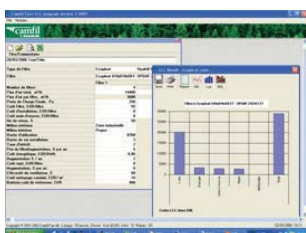
Camfil Academy:**Become the air filtration specialist in your company**

In addition to providing up to date air filtration solutions Camfil Farr can provide a structured training program covering all aspects of air filtration engineering. Adapted to suit your needs the training includes information on how to specify and select air filters, air filter standards, indoor air quality legislation, air filter application, and reducing energy and environmental impact.

**Camfil On-Site Expertise:****Camfil Filter Management**

Camfil has a fresh approach to managing on-site air filtration services. We understand that filtration is required for protecting people's health, ensuring legislative compliance and protecting valuable investments. We have our own site service team that can manage all aspects of your air filter requirements by offering a wholly inclusive service package.

Ensuring safe and efficient running of effective air filtration systems demands a multi-disciplined service solution. These extend beyond comprehensive logistics to ensuring that filters are fitted correctly, working efficiently, and optimised to reduce the overall cost of ownership for the lifetime of the installation.



In order to comply with current legislation and reduce cost of ownership of some installations, upgrading work is required. Camfil can provide a joined up solution which includes selection, supply, fitting, commissioning and validation of any new or upgraded installations.

Filter Installation Upgrade Service

Before



After

**Air Filter System Validation Service**

By fitting energy efficient filters and maintaining ventilation systems real energy savings can be made quickly. Maintained correctly these will translate into long lasting real reductions in cost and environmental impact. Camfil can provide a comprehensive package of air hygiene services that will ensure your systems are healthy, legislation compliant, and cost effective.

**Performance Managed Supply**

Camfil complete the "cradle to grave" responsibility for all your filtration needs by providing a unique logistics system at the centre of which is a national transport fleet. This dedicated fleet of vehicles with trained employees ensures that you get your goods when and where you need them. To complete the service, we can remove and dispose of used filters together with providing all of the required certification.

**On-Site testing / Troubleshooting**

We have a wide range of test equipment for On-Site measurements including particle counters, pressure gauges, airflow meters, energy data loggers, corrosion monitors and gas analysis equipment. Combined with the expertise of our engineers we are able to help you troubleshoot and improve your ventilation system.

Air Filter Laboratory Testing

Camfil Farr Malaysia Test Facility

Camfil Farr 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 Asia, our Malaysian facility operates around the clock, testing filters per ASHRAE Standard 52.2-2007 and European Standard EN779 and EN1822. 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 Farr Malaysia 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 Farr 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 Farr 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 Farr 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.



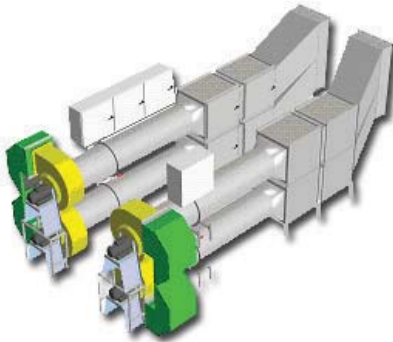
All of the photos of sub-micron particles used in this catalog were taken with Camfil Farr's SEM in Trosa, Sweden.

Camfield Lab

Camfil Farr 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. The Camfield lab unit 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.



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 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.



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 ventilation 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 Farr 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 Farr 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 Farr 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 local Camfil Farr office or distributor for details on Camfil Farr's In-Situ Filter Evaluation Program.



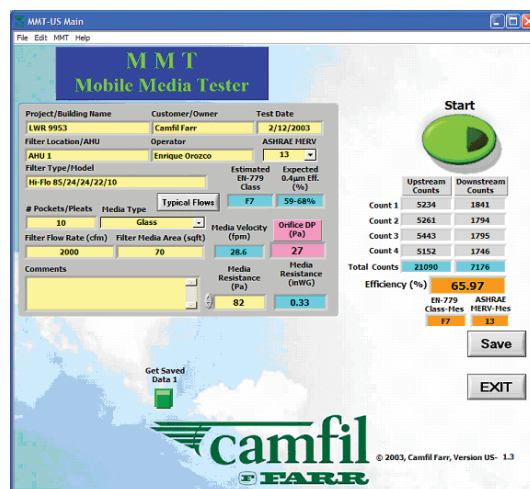
In-Situ Testing

Camfil Farr 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 Farr 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 Farr sales office or distributor for a media evaluation at your facility today.



Camfil Farr CamTester

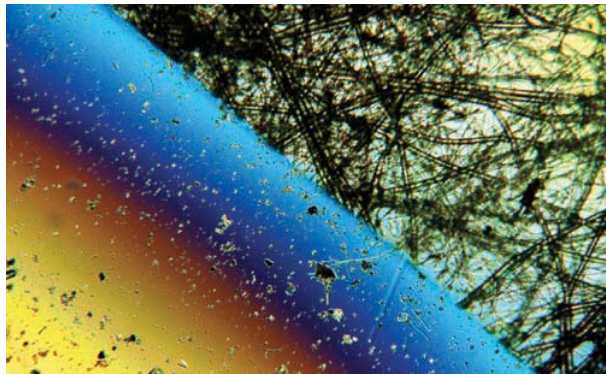
Air quality should always be the number one criterion for the selection of air filters. But, with today's sky-rocketing energy costs, with no downturn in sight, the energy used by a filter must be part of the filter selection equation. Media area, configuration, and the type of media all play a part 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 Farr representative can address these concerns with the Camfil Farr 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 Farr sales office or representative for a Cam-Tester evaluation today.

The industrialised world

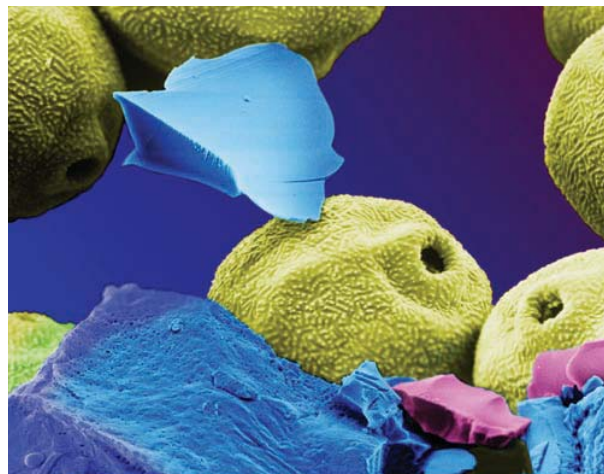
The industrialised world has changed immeasurably over the past 50 years. One very real difference is that the air that we breathe is more heavily, and more diversely, polluted. Although there are natural sources of pollution, the main concern is pollution caused by human activity. Tens of thousands of synthetic chemicals (which do not exist in any natural state) are now manufactured at an estimated rate of more than a billion tons per year. These chemicals are released into the atmosphere when they are produced, and when they are used they can travel great distances. They inevitably form part of our lives. Our lifestyles (work and leisure) mean that we spend more and more time inside buildings. The fact that buildings have to be ventilated means that we are increasingly exposed to particulate and gas pollution from the outdoor air.



The impact of pollution on our health

Air pollution can be categorised as either particulate (dust) or gas (molecular). Particles enter the body and the respiratory system via breathing. Gas or molecular pollution also penetrates the body via the air we breathe, but from the lungs it enters the bloodstream and in turn infiltrates the whole body. Though these chemicals may be invisible,

pollution does not pass us by. It takes numerous different forms, for example vehicle exhaust gas, factory chimneys, the dust raised by car traffic and cigarette smoke. It has been known for some time that exposure to pollution has an impact on human beings. The common symptoms are headaches, watering eyes and lower performance at work. Such symptoms are traditionally referred to as Sick Building Syndrome or similar terms.



The new European Standard for Ventilation

European Standard EN 13779 is aimed at achieving a comfortable, healthy indoor environment in all seasons with acceptable installation and running costs. EN 13779 has now been adopted as a national standard in all countries. It specifies the required filter performance in a system to achieve good IAQ taking into consideration contamination in the outdoor air. Outdoor air is split into 3 categories, from ODA 1, in which the air is pure apart from temporary pollution such as pollen, up to ODA 3 with high concentrations of gas and particles. This elevated pollution level ODA 3 is now typical of the contamination in urban areas.

Recommendations in EN 13779 for air filters

Outdoor air quality	IAQ Indoor Air Quality			
	IDA 1 (High)	IDA 2 (Medium)	IDA 3 (Moderate)	IDA 4 (Low)
ODA 1 (pure air)	F9	F8	F7	F6
ODA 2 (dust)	F7 + F9	F6 + F8	F5 + F7	F5 + F6
ODA 3 (very high concentrations of dust or gases)	F7 + GF + F9	F7 + GF + F9	F5 + F7	F5 + F6

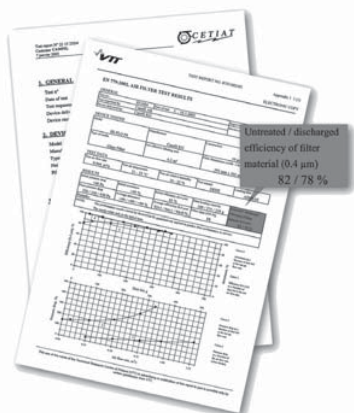
CITY

Our range of 'CITY' filters has been developed with the sole purpose of combating atmospheric pollution and its major components.

CITYCARB and CITYFLO combine particulate filtration with molecular and odour filtration. They are suitable for any new installation and can be readily installed to upgrade and improve systems currently equipped with standard filters.

With its higher molecular adsorption, CITYSORB is ideal for highly polluted urban environments. CITYSORB must be fitted in conjunction with a particulate filter above F7 efficiency, HIFLO or OPAKFIL type.

Eurovent Certified Performance

**Air filter certification - you can count on us!**

Camfil Farr, in conjunction with the main independent test laboratories in Europe, is committed to bringing you the highest levels of transparency with regard to the new test protocols for air filters.

The European Committee for Standardisation has recently published a new standard on "Particulate air filters for general ventilation - determination of filtration performance". One of the aims of this new standard is to detail the in-situ performance of an air filter.

This new test protocol provides accurate data on the effectiveness of your air filters operating under real life conditions. Please always specify filters tested in accordance with EN 779:2002. Your Camfil representative is available to explain this standard in detail should you require it - you can count on us!

Air filter performance

At Camfil Farr we are going a step further to ensure the best possible performance for our customers. The European ventilation industry organisation Eurovent, in collaboration with several European air-filter manufacturers, has developed a certification programme to guarantee that our products live up to our promises.

The key elements of the programme are that:

- **Published data must be correct**
- **The products must comply with the EN 779:2002 standard**
- **Filters must be tested by independent laboratories - SP in Sweden and VTT in Finland**
- **The test laboratories must be ISO 17025 certified**
- **We as manufacturers must be quality certified to ISO 9000 or a corresponding standard**
- **Each year, Eurovent selects, at random, four new filters from our range for inspection**

Read more on Eurovent's website: www.eurovent-certification.com

Eurovent's certification of our fine-dust filters means that you can rest assured that we live up to the performance requirements and the data we print in our official documentation. Our fine-dust filters are tested by independent laboratories selected by Eurovent and that means security for you. Select Camfil air filters with Eurovent certification - its guaranteed!

**Independent test results**

Our Eurovent certification covers bag filters, compact filters and panel filters in classes F5-F9, tested to EN 779:2002. The initial pressure drop must remain within the tolerance levels set out in EN 779:2002.*

All filters that we officially market in brochures or on our website in these filter classes are covered by the certification. Each class contains a range of product groups:

- **Same filter media/material (such as fibreglass)**
- **Same basic design (such as bag filters, compact filters etc)**
- **Same or lower air speed/net filter area**
- **Same filter class: F5, F6, F7, F8, F9**
- **Published data must be available, specifying the model, type, filter material, filter class as per EN 779:2002,**
- **Nominal airflow and initial pressure drop at nominal airflow.**

The filters are tested at independent test laboratories - in Sweden, the Technical Research Institute of Sweden, SP, in Borås; in Finland, VTT in Espoo. These are the only laboratories in Europe that are accredited to ISO 17025.

The test laboratories are not told which company's products they are testing, but are only given a number that Eurovent assigns to each individual filter.

* Tolerance levels for initial pressure drop defined in EN 779:2002: $+(10\%+Mt)$ or $+(10Pa+Mt)$, whichever is highest. $Mt = 5 Pa$ (tolerance level defined in EN 779:2002)

European Standard EN 1822:2009

All HEPA / ULPA filters produced by Camfil are supplied fully in accordance with the European Standard EN 1822:2009

- Qualified personnel responsible for testing.
- Unique serial number for each filter.
- Clear, unambiguous inspection procedures specifying test conditions, target values and actual performance of our filters.
- Complete traceability of materials and operations.
- Equipment and systems certified by accredited bodies.

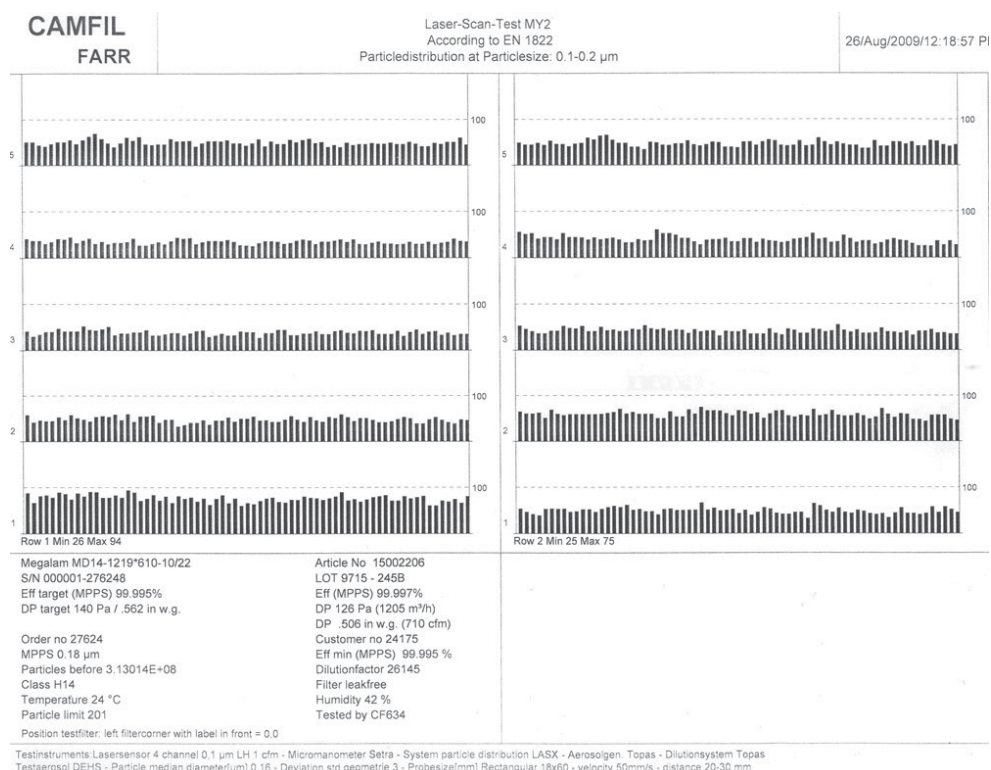
The CAMFIL extras:

- The filter label has a detachable copy which can be used to record the position of the individual filters in your installation.
- It can also be used as part of the validation process ensuring regulatory compliance of your installation.
- Automated scanning process to assure accuracy and reliability of the test result.

In short EN 1822:2009 means:

- Individually certified filters
- Tested using MPPS (Most Penetrating Particle Size) challenge.
- Detailed, standardised test procedures.
- Full traceability of materials and test data.

EN 1822:2009 Test Report



Filter Label

camfil FARR Clean Air Solutions

Megalam MD14-1219*610-10/22

Size: 1219x610x66

Nominal Airflow: 1205 m³/h

Pressure Drop: 140 ± 15% Pa

Filter Class: H14 EN 1822

Serial No: 0-276248

Article No: 15002206

Scan tested according to EN1822

↑
Air Flow

camfil FARR

Megalam MD14-1219*610-10/22

Size: 1219x610x66

Nominal Airflow: 1205 m³/h

Pressure Drop: 140 ± 15% Pa

Efficiency: 99.995% @MPPS

Efficiency: 99.999% @0.3µm

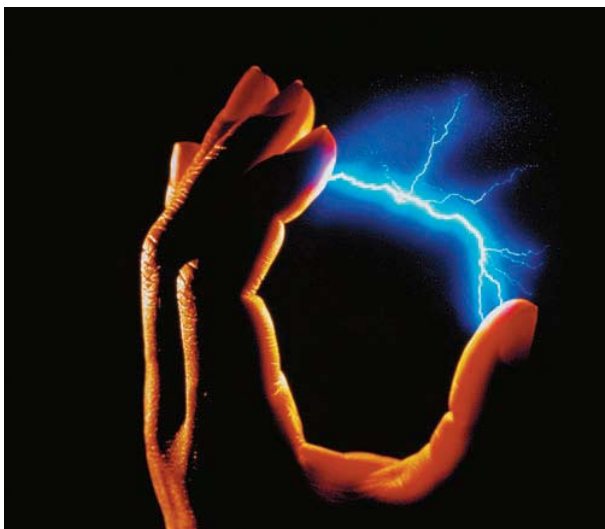
Filter Class: H14 EN 1822

Serial No: 0-276248

Article No: 15002206

Tel.: +80 5 366 8888 www.camfilfarr.com

Would You Like To Reduce Your Energy Outgoings?

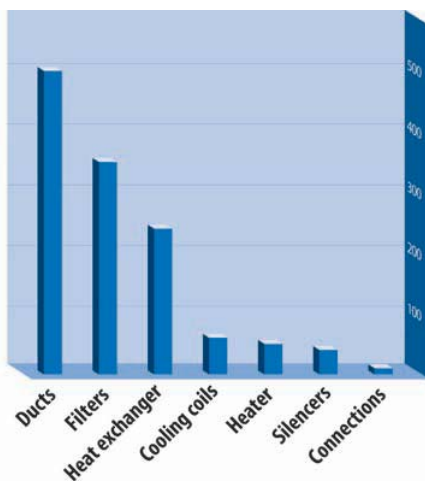


Economic optimisation of air filtration

The price of crude oil has more than doubled in recent years and the cost of electricity is rising throughout the world. The World Bank's Energy Group has predicted that total energy consumption is set to rise at the current rate for at least the next 50 years.

The cost of ventilation

Ventilating buildings, as we know, can be a very expensive business. The average energy cost of filters is around 30% of the total costs of the system. By choosing the right filter, for example the F7 for its efficiency and its very low average pressure loss, energy savings can be made whilst maintaining a high level of IAQ. When you consider that the air filter is the most inexpensive and simplest component to change, savings can be made quickly.



Typical pressure loss (Pa) in a ventilation system with 2 stage filtration

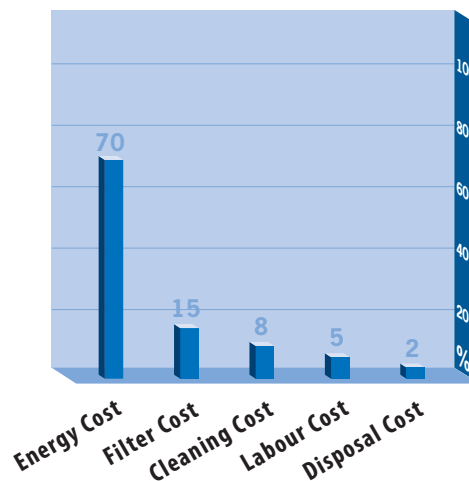
1Pa = 1 USD

A rule of thumb, for a typical installation running for one year, is that one additional Pascal in pressure drop adds 1 USD per filter in extra energy cost.

A badly designed filter construction could add 50 Pascal compared to a well engineered filter, even if it claims to have the same efficiency. In other words it adds 50 USD to the annual energy bill, for every filter.

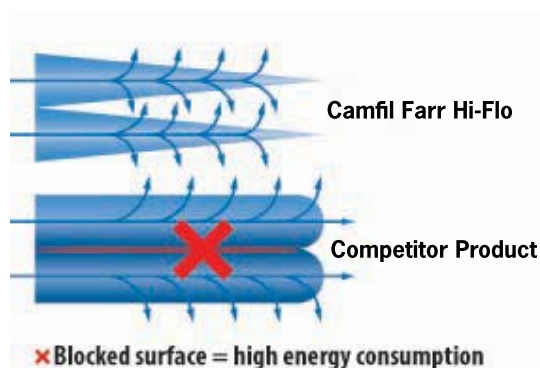
70% of the total cost comes from energy costs

Calculations show that energy normally accounts for 70% of the total cost of the life cycle of an air treatment system. Energy consumption is in direct proportion to the filter's average pressure loss.



Choosing the right filter saves energy

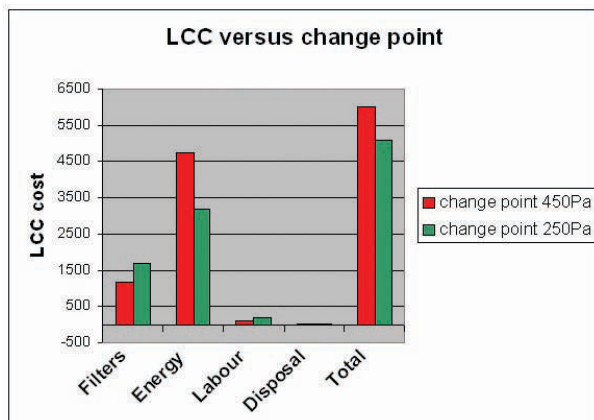
In order to optimise the lifespan of the filter and to reduce energy consumption, it is important to bear in mind the extent to which their configuration and their structure influence the average pressure loss.



Changing the filter at the right time saves energy

Changing filters at the right time is as important as optimizing the filter selection and can contribute to significant savings. Extending filter usage beyond its normal life will lead to a number of issues including excessive energy consumption, hygiene issues and reduced airflow.

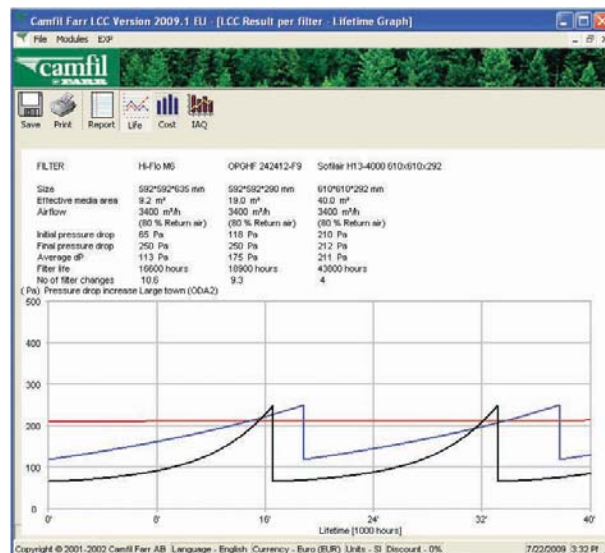
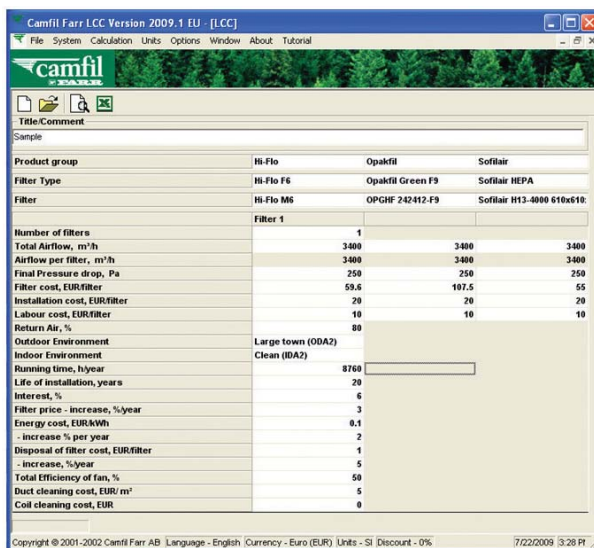
Would You Like To Reduce Your Energy Outgoings?



Software aimed at helping select the right filter = optimising energy costs

For over 40 years, Camfil Farr has played a pioneering role in designing filters with low average pressure loss for all efficiency levels for air conditioning and ventilation systems. Camfil Farr was the first filter manufacturer to develop sophisticated software that calculates the overall cost for the complete life cycle of air filters. As part of our continuous improvement, this software has evolved over time and it uses real life data collected from numerous tests in real use conditions. This enables us to calculate the pressure loss of the filter and its actual lifespan, rather than relying on theoretical calculations.

For more information and assistance, please contact your nearest sales office of Camfil Farr.



Sample			
Data for LCC calculation			
Number of filters	1		
Life of installation	20 (8760 h/year)		
Cleaning interval	>20 years		
FILTER	Hi-Flo M6	OPGHF 242412-F9	Soflair H13-4000 610x610x292
Energy Class	B	-	
Effective media area	9.2 m²	19.0 m²	40.0 m²
Airflow	3400 m³/h	3400 m³/h	3400 m³/h
	(80 % Return air)	(80 % Return air)	(80 % Return air)
Initial pressure drop	65 Pa	118 Pa	210 Pa
Final pressure drop	250 Pa	250 Pa	212 Pa
Average dP	113 Pa	175 Pa	211 Pa
Filter life	16600	18900	43800
No of filter changes	10.6	9.3	4
Labour cost/filter	10 EUR	10 EUR	10 EUR
<u>LCC costs in EUR based on 20 years lifetime of installation</u>			
FILTER	Hi-Flo M6	OPGHF 242412-F9	Soflair H13-4000 610x610x292
	EUR (%)	EUR (%)	EUR (%)
Filter Cost	503 (16.0)	820 (16.9)	179 (3.6)
Installation cost	20 (0.6)	20 (0.4)	20 (0.4)
Labour cost	74 (2.4)	66 (1.4)	22 (0.5)
Energy	2535 (80.7)	3928 (81.1)	4744 (95.5)
Disposal cost	9 (0.3)	8 (0.2)	3 (0.1)
Cleaning	0 (0.0)	0 (0.0)	0 (0.0)
LCC for filter	3141 (100.0)	4842 (100.0)	4968 (100.0)
<u>Total LCC cost (EUR)</u>			
Filter Cost	1502		
Installation cost	60		
Labour cost	162		
Energy	11207		
Disposal cost	20		
Cleaning	0		
Total	12951		

Molecular Filtration Technical Services

Beyond Filtration

Camfil Farr provides a comprehensive range of measurement services to complement their range of air filtration products. The services are used to assist in product selection, product validation and optimization of product performance.

Where possible we base our testing on international standards to ensure comparability and repeatability of results.

All our testing facilities are ISO 9001 : 2000 certified and measuring equipment is calibrated traceable to national standard.



Campure Coupons

Campure or reactivity coupons are an economical and simple way to assess the corrosive potential of an environment.

The coupons comprise of a pair of copper and silver foil strips which are exposed to the environment. After a given period, the coupons are returned to the laboratory where the surface corrosion is determined. The types and relative amounts of corrosion on each metal are indicative of the corrosive agents in the air.

Coupons may be used to assess an environment prior to selection and installation of a molecular filtration system and to validate the ongoing performance after installation.

Atmospheres may be classified according to the Instrument Society of America standard ISA-S71.04. Categories include Mild (G1), Moderate (G2), Harsh (G3) and Severe (GX).

Residual Life Analysis / Gigamonitor

It is important to be able to predict the impending failure of a molecular filter due to saturation of the media. This may be achieved through a programme of residual life analyses.

In this laboratory technique, a sample of media returned from the field is analysed for the residual content of the impregnation or chemical agent system.

A series of measurements made at 3 or 6 month interval allow the eventual deterioration in the condition of the media to be anticipated and plans put in place for a replacement.

Gas Challenges

Camfil Farr have a unique test facility that allows full scale molecular filters to be tested under conditions which precisely replicate those experienced in actual applications.

The molecular filtration test rig allows filters to be exposed to airflows with a wide variety of temperatures and relative humidities.

Site Services

Camfil Farr have the possibility to offer on-site support services. These may include:

- Supply and fit of filters.
- Removal and disposal of waste material
- Supply and fill of new media and in = site performance validation.

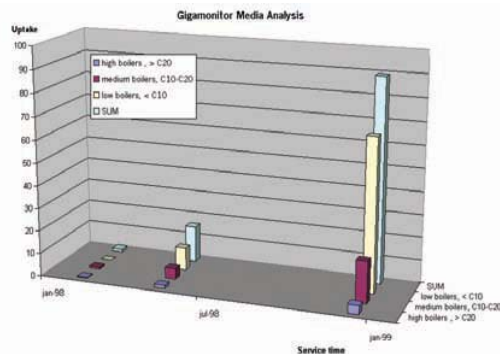


On-line Corrosion Monitoring (Isa Check)

Some critical or highly sensitive applications may require performance monitoring at a higher level than can be provided by a combination of the above techniques. In particular continuous real time monitoring may be required.

Camfil Farr offers an "Environmental Corrosion Monitoring System" that will give a direct and continuous surveillance of gas levels, based on the reaction of internal copper and silver strips.

LEDs indicate the environmental according to the Mild, Moderate, Harsh, Severe classifications. The unit also monitors and displays the two environmental parameters that strongly influence corrosion rates: temperature and relative humidity. 4-20 mA outputs are available as standard for remote applications.



Molecular Filtration Technical Services

Gigacheck™

The Camfil Farr Gigacheck™ is a passive analytical system to selectively measure airborne molecular contaminants (AMC) in cleanrooms and accompanying air handling systems used for microelectronics and integrated circuit manufacture.

Other possible applications include museums, airports, hospitals and oil and gas industries.

Common contaminants of analysis include acids, acid precursors, bases and ozone.

The kit and the samplers are supplied in a case and sealed plastic bags. The Gigacheck™ can be located inside the cleanroom, in a ventilation duct, inside make-up air systems, or in a mini environment. A proven tool, it is small, light weight, cost effective, and does not require any electrical connections or field calibration.

The only requirements are ambient temperature and normal airflow. Sampling time is 1 day – 1 month depending on the application. The Gigacheck™ provides average concentrations of AMC over the sampling period.

The Gigacheck™ is sealed and returned to our laboratory at the end of the exposure period.

The resulting data and information about the ventilation system and the process being protected allows us to design an optimized molecular filtration system based on your specific site condition.



Advanced Online Gas Monitoring

If you need to understand the short term variation of airborne molecular contaminant (AMC) concentrations in your cleanroom for an extended period of time, Camfil Farr online monitoring equipment will be the perfect solution. Equipped with 8 sampling ports, our system is able to measure the concentrations of Ammonia (NH₃), Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂), Hydrogen Sulfide (H₂S) or total reduced Sulfur compounds (TRS), down to a detection limit of 0.5 ppb(v). Data are recorded and can be plotted into graphs showing concentration changes over time in different location of your cleanroom or process equipments.

Our technology follows the recommendations of the International Technology Roadmap for Semiconductors (ITRS) for advanced air monitoring applications, using chemiluminescence technology for NO_x and NH₃, UV fluorescence detectors for SO₂ and H₂S, NH₃ and Sulfur compounds are the most critical contaminants in semiconductor and microelectronic applications, resulting in serious yield losses and product quality issues, even when present at trace levels. Please contact our local Camfil Farr team of experts to assist you with your advanced online AMC measurements.



ATEX

ATEX Directive: Explosive atmospheres

Two important new safety directives have entered into force in Europe. These new regulations come under the title of ATEX Directives and apply to manufacturers, suppliers and users of equipment intended for use in potentially explosive atmospheres (dangerous areas). Where no local regulations exist, the ATEX Directives could be used as a reference.

An explosive atmosphere is defined as a mixture with air, under atmospheric conditions, hazardous substances in the form of gases, vapors, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture. The 99/92/EC (ATEX 137) Directive known as the 'User Directive' requires employers to protect their employees from the risks posed by explosive atmospheres. The 94/9/ EC (ATEX 95 or ATEX 100A) Directive on 'Equipment and protective systems intended for use in potentially explosive atmospheres' covers electrical and non-electrical products intended for use in hazardous. places (gases, vapors, mists). Conformity with the ATEX Directives has been a legal requirement in all EU Member States since 1 July 2003.

In biopharmaceutical applications, some procedures must use ATEXclassified filters in certain places (please see table). Camfil Farr in Europe has developed HEPA filters and ATEX accredited housings for use in biopharmaceutical installations in order to prevent electrostatic dangers caused by gas or dust in an ATEX area. Camfil Farr has developed specific versions of ATEX for most filters and housings used in biopharmaceutical installations in order to prevent electrostatic conditions, of hazardous substances in the form of gases, vapours, dangers caused by gas or dust in an ATEX area. Camfil Farr's ATEX solutions are entirely certified in accordance with the requirements of, the ATEX Directives with the appropriate EX marking, the ATEX conformity statement and the instructions for use.

Key to the table:

*Definition of ATEX areas and corresponding product categories.
Definitions of areas*

Gas	Dust Areas	Definitions	Category ATEX	Typical suitability of place
0	20	Place where an explosive atmosphere is permanently present	1G	Equipment adapted to 0 areas
			1D	Equipment adapted to 20 areas
1	21	Place where an explosive atmosphere is probable occasionally under normal operating conditions	2G	Equipment adapted to 1 areas
			2D	Equipment adapted to 21 areas
2	22	Place where an explosive atmosphere is improbable under normal operating conditions, but, where applicable, only lasts a short time.	3G	Equipment adapted to 2 areas
			3D	Equipment adapted to 22 areas

All Camfil Farr ATEX air filtering solutions

All Camfil Farr ATEX air filtering solutions are certified for use in explosive gas atmospheres (Classes 1 and 2) and explosive dust atmospheres (Classes 21 and 22). They comply with European Standard EN 13463-2001 Annex C Non-electrical equipment for potentially explosive atmospheres, as attested by the conformity statement attached to these products.



Caring for the Environment

“How will your filters help you to reduce the environmental impact of your installations?”

Camfil has been involved in air quality for over 40 years, and has to set an example when it comes to the environment. It therefore has an obligation to provide its customers with practical assistance on green issues. With regard to complying with the law on waste disposal, Camfil is with you all the way; in designing products and services, Camfil shares your environmental concerns.

It is now widely acknowledged that air conditioning filters can be considered ordinary industrial waste, whereas filters used in environments containing potentially hazardous products (e.g. return air from clean rooms, spray booths and operating theatres) should be considered special industrial waste and must be disposed of by an approved route using accredited systems.

Please Note - your individual circumstances depend entirely on your processes and we recommend that you approach your usual waste disposal provider, who will be qualified to advise you on the matter.

In order to minimise waste, Camfil pay close attention to the life cycle of the product:

1. We make strenuous efforts to extend the lifespan of our filters and to optimise their performance, which means that you reduce your operating costs, the frequency with which you have to replace the filters and the cost of their disposal.

Just look at the large filter surface used in many of our products and remember large filter area is synonymous with long filter life.

2. We favour the use of recyclable or incinerable materials.
3. We are continually researching effective materials with low pressure loss, a parameter that has a direct influence on the energy consumed during the lifetime of the filter.
4. The Green CAMFIL range ensures that you can dispose of your used filters with less hassle and at lower cost. The use of plastics or cardboard lends itself to the incineration of used filters whilst ensuring compliance with all provisions of environmental law.
5. We minimise the weight of materials used in the construction of our filters which helps reduce the waste mass as far as possible when the filter reaches the end of its life.
6. In our ISO 14001 certified factories, we are phasing out the use of chloride solvents and hazardous products from our processes.



Follow up CFM

Conscious of the increasing importance attached by our customers to waste management, Camfil can support you and take charge of replacing and organising the disposal of certain used filters as part of its CAMFIL FILTER MANAGEMENT (CFM) programme. For more information and to find out whether this service might work for you, please contact us.



Camfilcaring

Our corporate responsibility goes beyond the products and services we offer. Camfilcaring is a program we have developed that not only covers the front end of our products and services, but also ensures we have responsible suppliers, use environmentally friendly production methods, minimize energy consumption and waste in manufacturing processes and cares for our employees and the community we operate in.





Our corporate website www.camfilfarr.com contains a wealth of information as well as links to individual country websites.

This is a good starting point to keep you updated about our company, products and services, technology and applications.

You will also find contact details of our offices, distributors and agents worldwide.



Read about **industries** we serve with specific product recommendations for your application as well as technical papers and links to relevant websites. Our Quick Selection Guide provides an easy step by step recommendation of products that suits your needs.

The **Products** pages include all our main products and list key product features and benefits. Camfil Farr is serving a wide range of OEM customers including the car industry, domestic appliances, medical devices, laboratory equipment, printing and the electronics industry. Whether it's in space, in an operating theater or in a lab, we offer equipment suppliers shared product development, fast prototyping and cost effective performing products.

The **Filter Technology** section is your technical library and a foundation from which you can converse with others about how air filters work. We also include links to relevant industry related websites.

The **Press Room** features news and information about Camfil Farr and the company's core business and technologies and you can download our Annual Report and the newsletter AirMail.

The **News** section includes press releases and other news about the company.



The general product catalogue, industry specific segment brochures and corporate presentation is found in the **Catalogue** section.



www.green-air-filters.com is a website maintained by Camfil Farr's North American organisation. This site contains many **case studies** regarding life cycle cost, energy savings and indoor air quality.



Information about Camfil Farr's **Air Pollution Control products and services** can be found at www.camfilfarrapc.com. This site includes references, case studies, industry specific applications as well as catalogues, drawings and datasheets.



Application CD can now be installed on your desktop or laptop as a program.

Insert the CD-ROM in your computer. Open Windows Explorer, locate the icon for your CD-ROM and double-click it.

1. If you do not have Acrobat Reader, go to <http://get.adobe.com/reader/> to install the Program. Once installation is complete, open the catalogue.



On this CD, you will find useful information on our:

- Company
- Products
- Applications
- Case Studies
- Sustainability
- Certificates
- Handling Instructions
- Terms & Conditions

Air Filter Technology

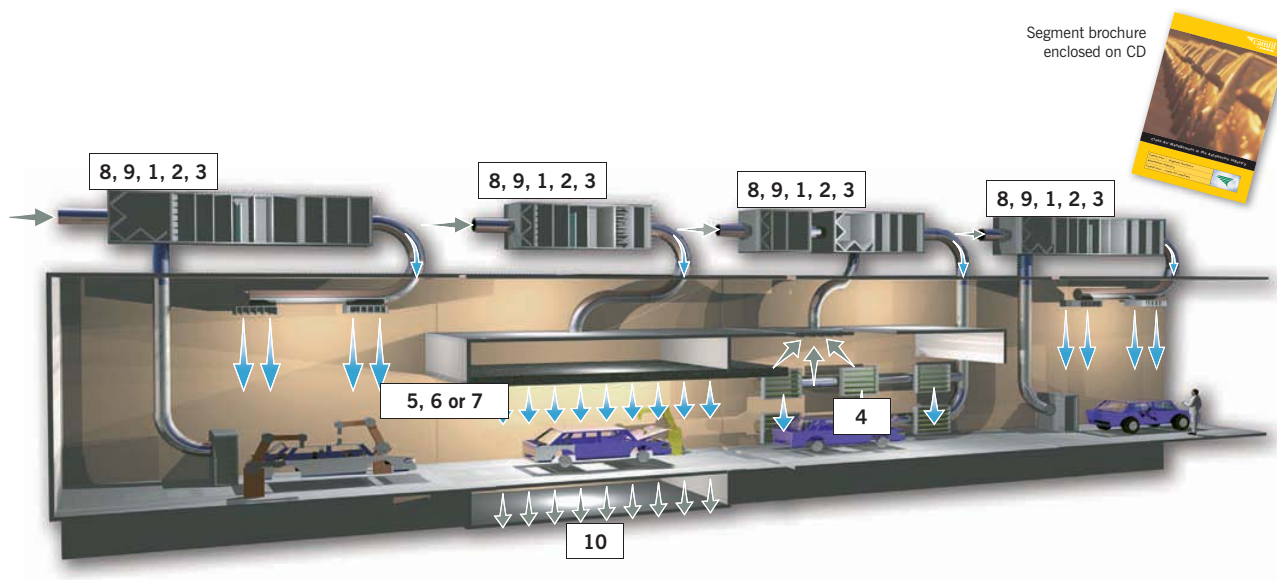
Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

Automotive Industry

Few industrial applications demand such a clean working environment as painting facilities. Paint spraying facilities require a constant supply of fresh air for hygiene and safety reasons. We currently provide clean air and services to many major automotive plants throughout the world. We provide the best possible cost effective clean air solutions, customised and performance-optimised to meet your demands. Supplied and delivered exactly according to your needs – by Camfil Farr.



Air Filter Technology

Pre-filtration,
Class G3 to F5

Automotive Industry recommendations



1. Hi-Flo



2. S-Flo



3. Opakfil



4. Airopac HT/Panolair HT



5. CDM-600



6. Panolair



7. CamGrid SM 20



8. 30/30



9. Hi-Cap



10. Cam Glass Media

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

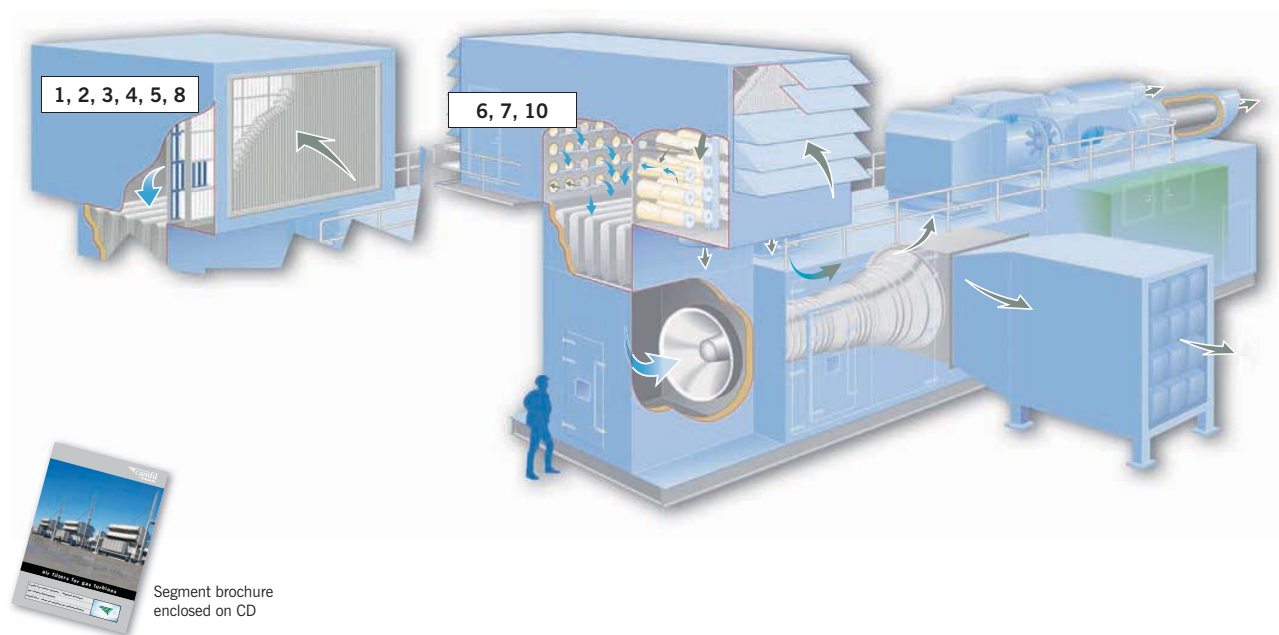
Molecular Filtration

Frames, housings
and specialty filters

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Gas Turbines, Air Filters and Systems

Camfil Farr provides systems solutions for the turbo machinery and power systems industry. Our solutions include filters, ducting, fans, silencers, and deicing. With more than 40 years of experience, Camfil Farr delivers value to customers worldwide whilst providing everyone with something essential - clean air.



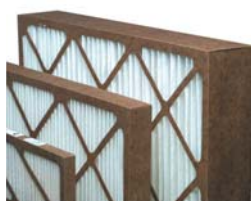
Air Filter Technology

Pre-filtration,
Class G3 to F5

Gas Turbine, Air Filters and System recommendations



1. 30/30 GT



2. 30/30 WR



3. CamClose



4. Hi-Cap Green



5. Cam-Flo XMGT



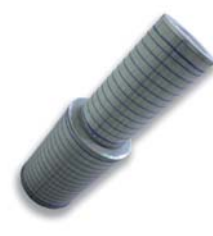
6. Cam GT



7. Cam GT Box Type



8. CamPulse EF



9. Hemipleat



10. Tenkay Hemipleat

Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

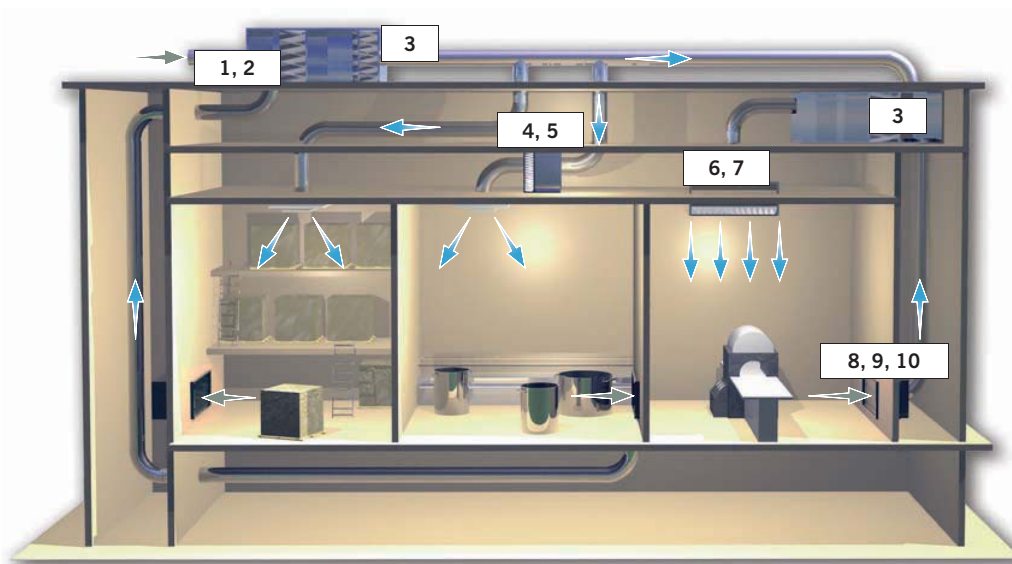


CamfilFarrAsiaPacific
www.camfilfarr.com

Food Industry

Protecting human health is a major concern for governments throughout the world. In many countries agencies associated with food safety have the authority to take direct action against manufacturers who fail to ensure the safety of foodstuffs that they produce. To prevent the air conditioning system from becoming contaminated, temperature, humidity and cleanliness must be closely controlled. Talk with the experts in clean air solutions - Camfil Farr.

Segment brochure
enclosed on CD



Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

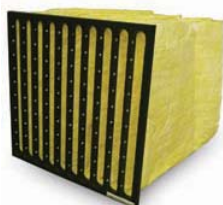
Molecular Filtration

Frames, housings
and specialty filters

Food Industry recommendations



1. Hi-Cap Green



2. Hi-Flo Green



3. Opakfil F8



4. Sofilair H13



5. FC - Filter Casing



6. Sofdistri



7. Megalam



8. Sofdistri Exhaust



9. 30/30



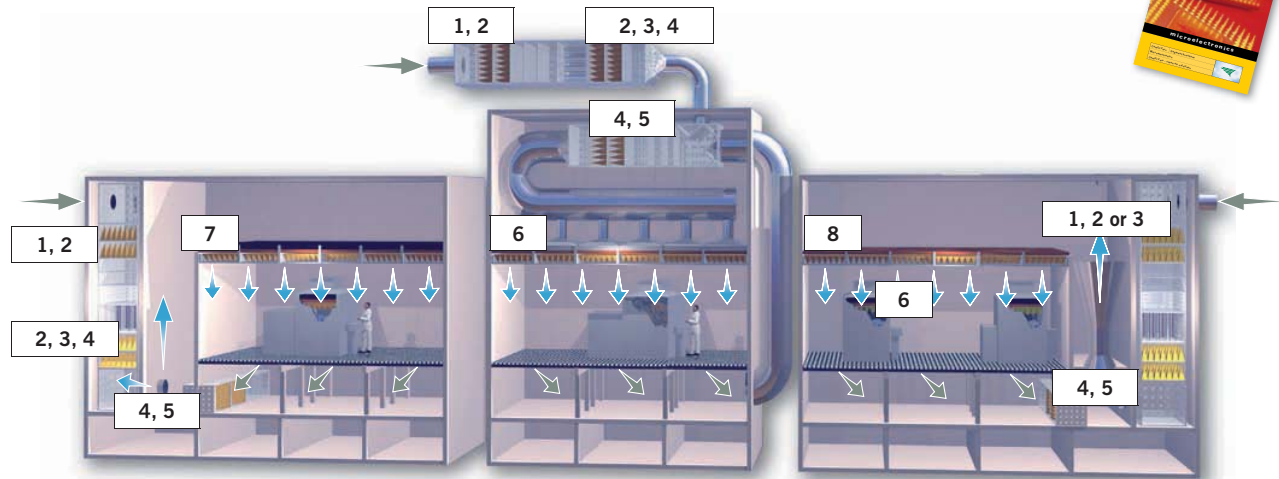
10. Aeropac Green

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Microelectronic Industry

Advanced production methods often require very clean air, and as technology advances these requirements look likely to increase. Camfil Farr is recognised as the leading supplier of high efficiency filtration products for the microelectronics industry. HEPA/ULPA filters are produced within controlled environments in our ISO 9000-certified plants and are individually tested and certified to ensure compliance. Our large production capacity ensures the availability of our products at all times throughout the world.

Segment brochure
enclosed on CD



Air Filter Technology

Pre-filtration,
Class G3 to F5

Microelectronic Industry recommendations



1. 30/30



2. Hi-Cap



3. S-Flo



4. Sofilair H13/H14



5. Gigapleat

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17



6. Silent Hood



7. Megalam MX MG



8. Megalam U

Molecular Filtration

Frames, housings
and speciality filters

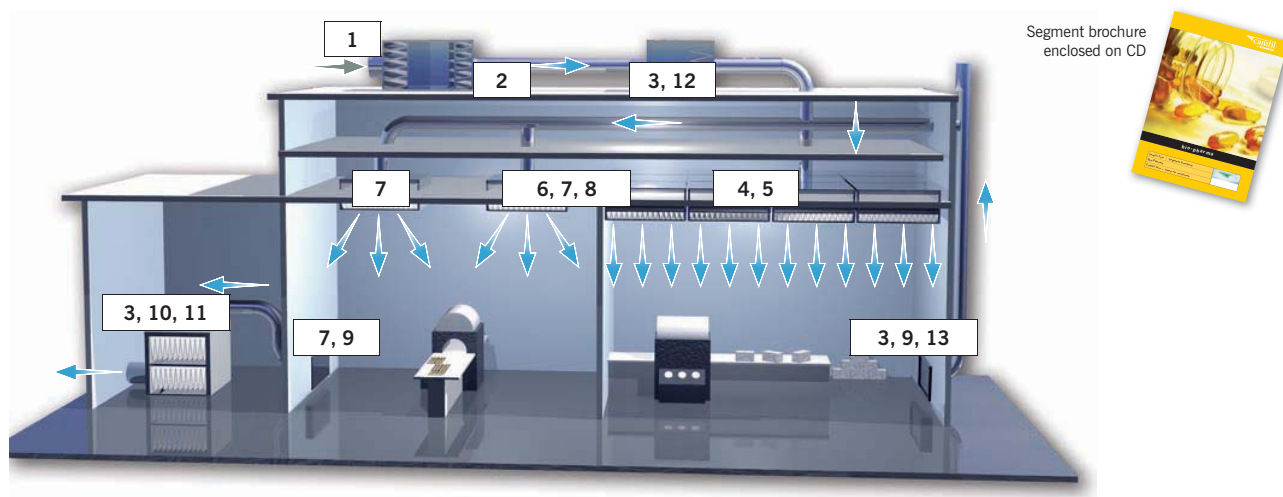
As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.



CamfilFarrAsiaPacific
www.camfilfarr.com

Pharmaceutical Industry

For more than forty years Camfil Farr has been a leading supplier of air filter products and services to the Bio-Pharma Industry. Many of our clients have multiple facilities located around the world. Camfil Farr is viewed by many of the largest pharmaceutical manufacturers as a partner and well positioned to support their air filtration demands on a local and global basis.



Air Filter Technology

Pre-filtration,
Class G3 to F5

Pharmaceutical Industry recommendations



1. 30/30



2. Hi-Flo



3. Sofilair H13



4. CamGrid



5. Megalam T "U"

Bag and Compact Filters,
Class F5 to F9

6. Sofdistri



7. DC Bibo



8. Pharmaseal AP 9



9. Pharmatain



10. Pharmaseal Exhaust AP

HEPA / ULPA Filters,
Class E10 to U17

11. Airopac/Opakair



12. FC - Filter Casing

13. Ecopleat/Airopac
Green

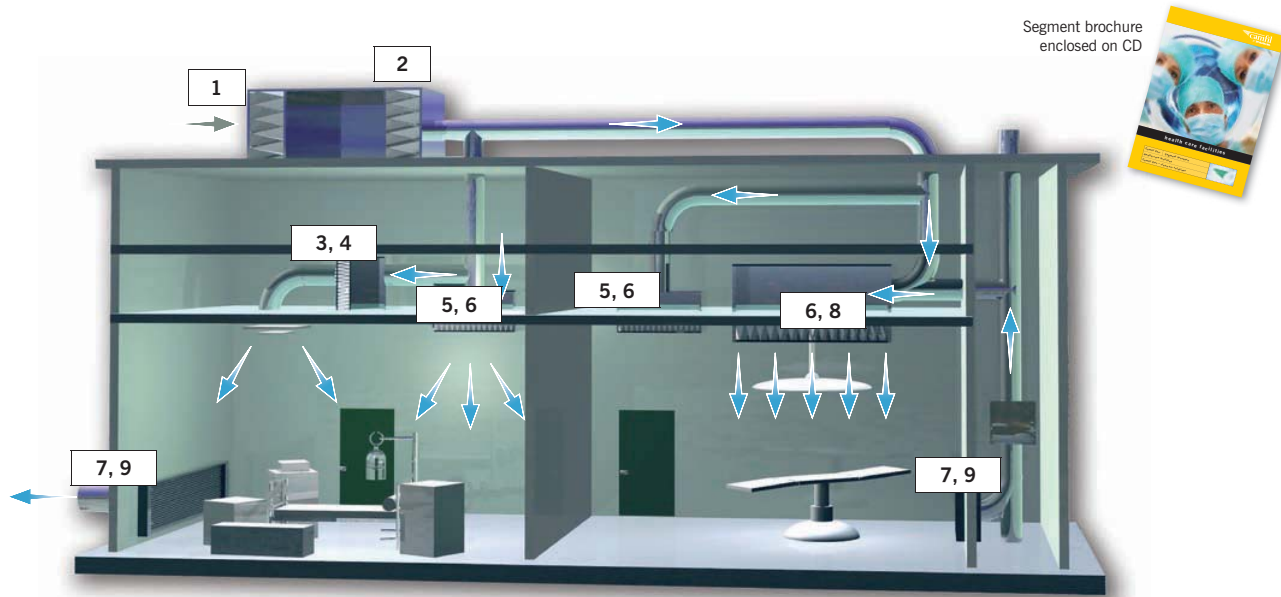
Molecular Filtration

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Frames, housings
and specialty filters

Hospitals and Healthcare

Nowhere is air filtration more important than in health care facilities. Air filters offer excellent protection from airborne diseases in health care facilities, provided that they form part of an overall air quality control programme. Camfil Farr provides a comprehensive solution that ensures the provision of this quality. Our extensive scope of supply ranges from providing air filters to satisfy the most demanding standards, air filter housings, system validation and monitoring, filter management, and specialist consultancy services. Our products provide safe and comfortable environments for patients, visitors and healthcare professionals.



Air Filter Technology

Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9

Hospital and Healthcare recommendations



1. Hi-Flo F7



2. Hi-Cap



3. S-Flo



4. FC-Filter Casing



5. Pharmaseal AP



6. Sofilair



7. Ecopleat



8. Sofdistri



9. Pharmaseal Exhaust AP

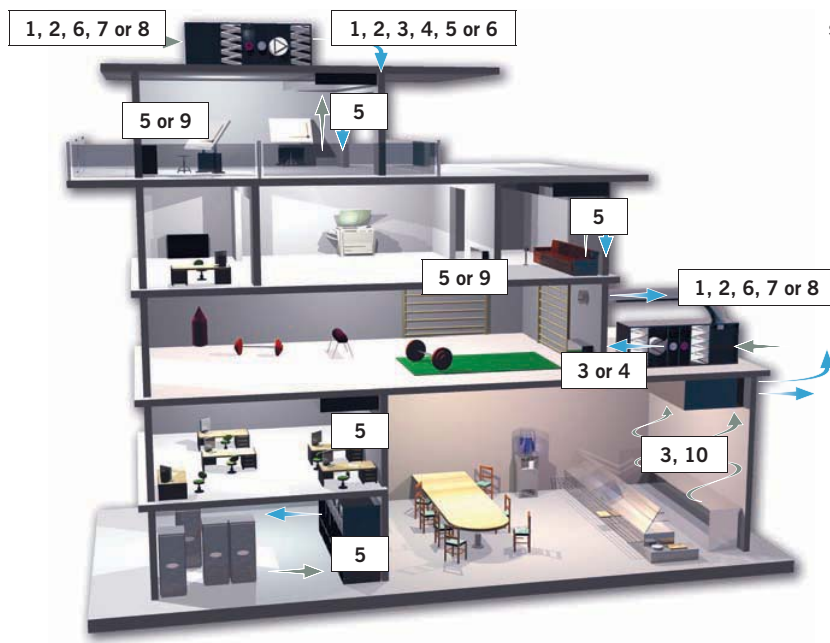
HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

Public Buildings

Concerns over public health have resulted in increased awareness about indoor air quality (IAQ). We now spend approximately 80% of our time in indoor spaces and legislation now requires that these spaces are comfortable, safe and without risk to health. Camfil Farr filters for air conditioning systems help to safeguard human health by preventing airborne contamination from entering these environments. In addition correctly selected and maintained air filters keep air conditioning systems clean ensuring that they perform in accordance with design parameters. Camfil Farr's extensive range of comfort air filters, are typically used in offices, schools and shopping centres etc.



Segment brochure
enclosed on CD



Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and speciality filters

IAQ recommendations



1. Hi-Flo



2. Opakfil Green



3. CityCarb



4. City-Flo



5. Ecopleat



6. S-Flo



7. Hi-Cap



8. 30/30



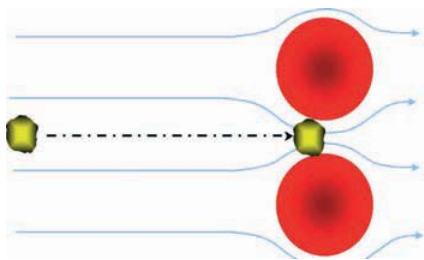
9. Fan Coil Filter



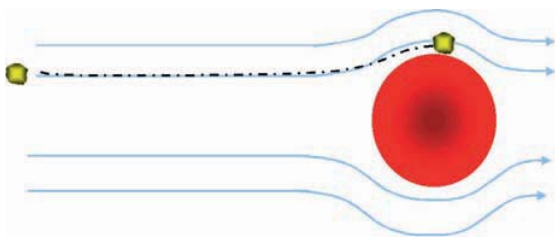
10. airMet Metafilter

Principles of Air Filtration

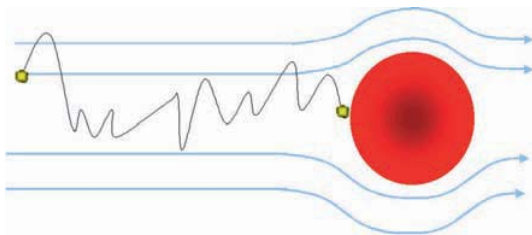
Five different collection mechanisms govern particulate air filter performance: straining, interception, diffusion, inertial separation, and electrostatic attraction. The first of these mechanisms applies mainly to mechanical filters and is influenced by particle size. Electrostatic attraction is obtained by charging the media as a part of the manufacturing process.



Straining (sieving) 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 across most filter designs, and is entirely related to the size of the particle, media spacing, and media density.

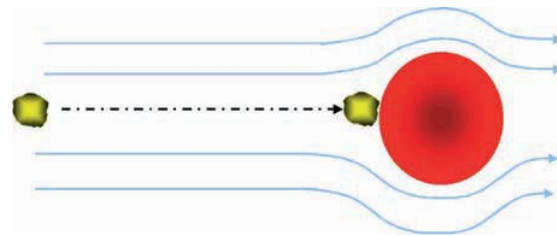


Interception occurs when a large particle, because of its size, collides with a fiber in the filter that the air stream is passing through.

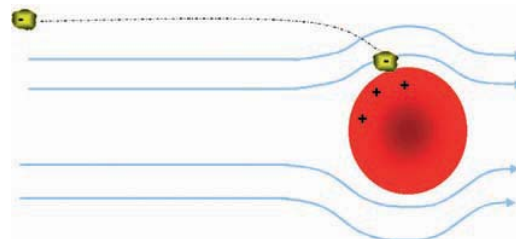


Diffusion occurs when the random (Brownian) motion of a particle causes that particle to contact a fiber. As a particle vacates an area within the media, by attraction and capture, it creates an area of lower concentration within the media to which another particle diffuses, only to be captured itself. To enhance the possibility of this attraction, filters employing this principle operate at low media velocities and/or high concentrations of microfine fibers, 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



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.

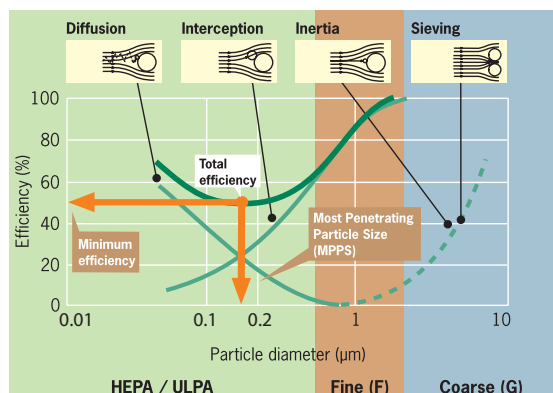


Electrostatic attraction plays a minor role in mechanical filtration. After fiber contact is made, smaller particles are retained on the fibers by a weak electrostatic force. The force may be created through a manufacturing process, or be dependent upon airflow across media fibers. The force is eradicated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

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

Principles of Air Filtration

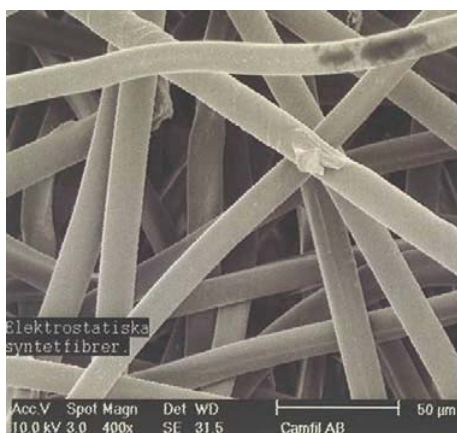
The following chart notes the four mechanical particle capture effect principles and their value to relative particle sizes.



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 99% 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.

ASHRAE Standard 52.2-2007

In ASHRAE Standard 52.2-2007, 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 52.2-2007

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.

In January 2008, the ASHRAE Standards Committee, charged with reviewing and improving the ASHRAE 52.2-2007 test standard for air filters and air cleaners, initiated a change to address this problem.

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.

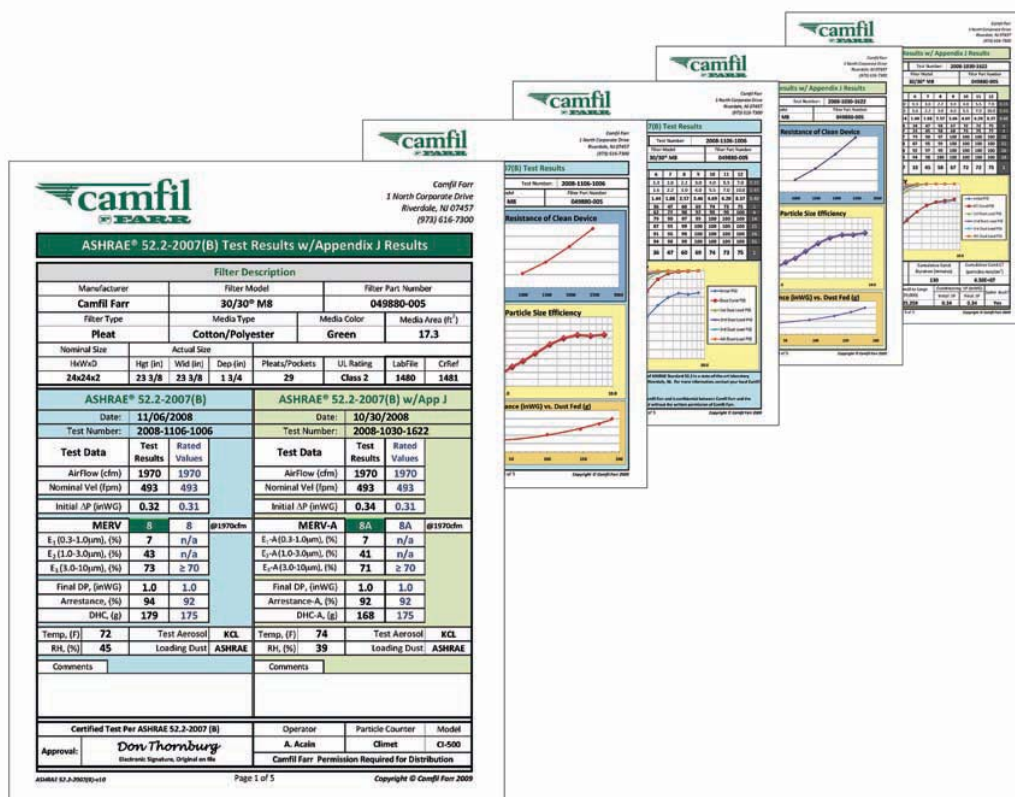
Importance of Change

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 Farr ASHRAE Test Report (all 5 pages shown)



How to read an ASHRAE 52.2-2007 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

HEPA Filter Testing

HEPA/ULPA Cleanroom Filter Testing in Camfil Farr 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 Comité Européen de Normalization, has developed a Standard, EN 1822:2009, 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
E 10	85	15		
E 11	95	5		
E 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
U 17	99.999995	0.000005	99.9999	0.00001

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 Farr 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 100,000 (M5.5) cleanroom. All testing is conducted per the controlled and documented procedures of Camfil Farr’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. DEHS is Camfil Farr’s standard liquid challenge aerosol. By request we can also test with the solid aerosol Polystyrene Latex Spheres (PSL).

Any leak with a penetration exceeding five (5) times the filter’s average rated penetration, is repaired 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 Farr raw goods supplier specifications, suppliers are required to test each master roll of Camfil Farr filtration media for efficiency, utilizing Condensation Nuclei Counters (CNC) & Q127 Penetrometers. Test results are submitted to Camfil Farr for review & material acceptance prior to release authorization.

Filter Efficiency Testing

Manual Scan: Camfil Farr’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.

Product Performance Barometers

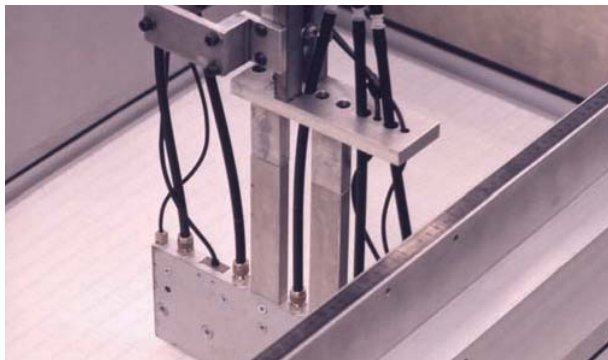
Filter Media Pressure Drop Testing

Per Camfil Farr specifications, approved suppliers test each lot of media for pressure drop. Test results are submitted to Camfil Farr 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.

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.



Auto-Scan Testing

Auto-Scanning Protocol

Camfil Farr 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.

DEHS is the standard challenge aerosol. To further enhance system sensitivity, Camfil Farr 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. HEPA filter with label of test results.



HEPA filter with label of test results.

UL 900

Camfil Farr 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".

Please call factory for the specific rating of your product(s).

Factory Mutual

Camfil Farr's Megalam Panel and Ducted Ceiling Module type HEPA/ULPA filters meet the approval requirements of Factory Mutual Research Corporation (FM) for product construction of limited combustibility, when installed in an approved ceiling grid. For this approval, FM tests the filter as a component in a complete ceiling grid system.

During the ten (10) minute fire exposure test for Factory Mutual Standard FM-4920 ceiling system approval, there was no visible ignition of the Camfil Farr filter, and no flame spread. For this test, the ceiling system tested was composed of a third party ceiling grid, third party gel sealant, and Camfil Farr filter. The complete system passed all technical requirements of the standard.

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

Factory Mutual,
1301 Atwood Avenue, P.O. Box 7500, Johnston, R.I. 02919,
Phone: (401) 275 3000; Fax: (401) 275 3029

UL Filter Testing

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

UL 900 establishes smoke and flammability limits for clean air filters.

It is important to note that the toxicity of products of combustion, resulting from a filter's exposure to flame, is outside the scope of UL 900, as is the filter's filtration capability before or after flame exposure.

To obtain a UL listing on a product, application is made to Underwriters Laboratories, and several samples are then submitted for test. All of these samples must successfully pass the criteria established. However, a listing is then granted only if the manufacturer further agrees to a follow-up service procedure. In this procedure, a UL representative visits each point of manufacture and selects at random a sample of the listed product. This sample is returned to UL for retest to assure continued compliance with the appropriate test criteria.

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

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

Most Camfil Farr products have the UL logo on the label. Should a time arise when you need evidence of a UL rating on a Camfil Farr filter, please contact us at **+605 366 8888**.



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

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 ¹
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	

¹ Camfil Farr recommends an intermediary stage to increase the life of the HEPA filter (MERV 13 or 14)

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Standards, Regulations and Recommendations

Ventilation Filters

Standards

Year	Reference	Type of test	Classification
1968	ASHRAE 52.2	ARRESTANCE EFFICIENCY	MERV 1 - 20
1980	EUROVENT 4/5	ARRESTANCE EFFICIENCY	EU1 to EU4 - EU5 to EU9
1982	AFNOR NF X 44.012	ARRESTANCE EFFICIENCY	
1993	CEN EN 779	ARRESTANCE EFFICIENCY	G1 to G4 - F5 to F9
2003	CEN EN 779:2002	ARRESTANCE EFFICIENCY	G1 to G4 - F5 to F9

The new standard for general ventilation filters EN 779:2002

1. Measurement of filter efficiency using modern particle counting technique
2. The aerosol challenge is DEHS (the same as used with HEPA filters)
3. Classification based on a particle size of 0.4 μm
4. The test includes initiatives to determine the discharged efficiency of filters to better represent their performance in use. These are shown in Annexe A.

Why a new standard?

Certain types of filter media rely on an electrostatic effect to achieve a high level of efficiency whilst promising a low pressure drop for a given air volume.

It is important that users are aware of filters that rely on this electrostatic effect and are also informed about the degradation in efficiency once the electrostatic effect dissipates.

This new test procedure describes in Annexe 'A' a mechanism that removes the electrostatic effect by treating the filter material with Isopropanol. This discharges the filter and enables the real efficiency to be determined. The average efficiency of the filters after discharge is recorded on the certificate.

Filters are classified based on their performance against particles of 0.4 μm . Filters in Group F must achieve an average efficiency greater than 40%; below this they are included in Group G.

ASHRAE 52.2/EN779/EN1822 Cross Reference Table

ASHRAE 52.2	EN779 / EN1822
MERV 1	EN779 : G1
MERV 2	EN779 : G2
MERV 3	EN779 : G2
MERV 4	EN779 : G2
MERV 5	EN779 : G3
MERV 6	EN779 : G3
MERV 7	EN779 : G4
MERV 8	EN779 : G4
MERV 9	EN779 : G4
MERV 10	EN779 : F5
MERV 11	EN779 : F6
MERV 12	EN779 : F6
MERV 13	EN779 : F7
MERV 14	EN779 : F8
MERV 15	EN779 : F9
MERV 16	EN1822 : E10
MERV 17	EN1822 : H13
MERV 18	EN1822 : H13

ASHRAE 52.2	EN779 / EN1822
MERV 19	EN1822 : H14
MERV 20	EN1822 : H14

EN 779:2002 Classification

EN 779:2002 standard		Average arrestance Am (%)	Average efficiency Em (%)	EUROVENT 4/5 equivalent
Filter group	Filter class	Filter class limits		Filter class
Coarse (G)*	G2	65 ≤ Am < 80	-	EU 2
	G3	80 ≤ Am < 90	-	EU 3
	G4	90 ≤ Am	-	EU 4
	F5	-	40 ≤ Em < 60	EU 5
Fine (F) **	F6	-	60 ≤ Em < 80	EU 6
	F7	-	80 ≤ Em < 90	EU 7
	F8	-	90 ≤ Em < 95	EU 8
	F9	-	95 ≤ Em	EU 9

Initial efficiency (Ea): * Ea < 20% ; ** Ea \geq 20%

Final pressure drop: * 250 Pa ; ** 450 Pa

Very High Efficiency Filters

Standards

Year	Reference	Type of test	Classification
1956	MIL STD 282	DOP	0.3 μm -
1972	AFNOR NF X 44.011	Uranine	0.15 μm -
1976	EUROVENT 4/4	NaCl	0.65 μm EU10 to EU14
1995	CEN EN 1822	MPPS	0.1 to 0.2 μm HEPA: E10 to H14 ULPA: U15 to U17

EN 1822:2009 Classification

Filter group	Filter class	Minimum efficiency (%)	Maximum penetration (%)	Minimum P.C.	Minimum efficiency (%)	Maximum penetration (%)	Minimum P.C.
EPA (E)	E10	85	15	6.7	-	-	-
	E11	95	5	20	-	-	-
	E12	99.5	0.5	200	-	-	-
HEPA (H)	H13	99.95	0.05	2,000	99.75	0.25	400
	H14	99.995	0.005	20,000	99.975	0.025	4,000
ULPA (U)	U15	99.9995	0.0005	200,000	99.9975	0.0025	40,000
	U16	99.99995	0.00005	2,000,000	99.99975	0.00025	400,000
	U17	99.999995	0.000005	20,000,000	99.99999	0.0001	1,000,000

EPA: Efficiency Particulate Air (filter)

HEPA: High Efficiency Particulate Air (filter)

ULPA: Ultra Low Penetration Air (filter)

P.C.: Purification Coefficient

Standards, Regulations and Recommendations

Classification as per Eurovent 4/4 recommendation, NaCl method

EUROVENT 4/4	Initial efficiency Ei (%)	Penetration Pi (%)
Filter class	Limits of filter classes	
EU 10	$95 \leq Ei < 99.9$	$5 \geq Pi > 0.1$
EU 11	$99.9 \leq Ei < 99.97$	$0.1 \geq Pi > 0.03$
EU 12	$99.97 \leq Ei < 99.99$	$0.03 \geq Pi > 0.01$
EU 13	$99.99 \leq Ei < 99.999$	$0.01 \geq Pi > 0.001$
EU 14	$99.999 \leq Ei$	$0.001 \geq Pi$

Clean rooms

Classification of different air qualities required for manufacture of sterile products

Maximum number of particles per m ³ of a size greater than or equal to					Max. nbr. of μ organisms per m ³ (active)
0.5 μ m	0.5 μ m	0.5 μ m	0.5 μ m		
inactive (b)		active			
A	3.500	0	3.500	0	< 1
B	3.500	0	350,000	2.000	10
C	350,000	2.000	3.500,000	20,000	100
D	3.500,000	20,000	not defined (c)	not defined (c)	200

Pharmaceutical industry

Guide to good Manufacturing Practice (2002) (b) Corresponds approximately to the US Federal Standard 209 E and ISO as follows: classes A and B to class 100. M 3.5. ISO 5; class C to class 10,000. M 5.5. ISO 7; class D to class 100,000. M 6.5 ISO 8.

Comparison of international classification standards

Nbr of part 0.5 μm/ m³ (approx.)	US Fed. Std 209 E 1992		EN ISO 14644- 1 1996	France AFNOR NF X 44.101 1981	European Union Pharma industry Guide GMP 1989	Nbr of part 0.1 μm/ m³ (approx.)
-	-	-	ISO 1	-	-	10
1	-	-		-	-	35
4	-	-	ISO 2	-	-	100
10	M 1	-	-	-	-	350
35	M 1.5	1	ISO 3	-	-	1,000
100	M 2	-	-	-	-	3,500
353	M 2.5	10	ISO 4	-	-	10,000
1,000	M 3	-	-	-	-	35,000
3,530	M 3.5	100	ISO 5	4,000	A and B	100,000
10,000	M 4	-	-	-	-	350,000
35,300	M 4.5	1,000	ISO 6	-	-	1,000,000
100,000	M 5	-	-	-	-	-
353,000	M 5.5	10,000	ISO 7	400,000	C	-
1,000,000	M 6	-	-	-	-	-
3,530,000	M 6.5	100,000	ISO 8	4,000,000	D	-
10,000,000	M 7	-	-	-	-	-
35,000,000	-	-	ISO 9	-	-	-

Permissible particle levels in different classes of clean rooms and clean zones

ISO classification CD 14644-1 (1996)	Maximum permissible concentrations (particles/m ³ of air) of particles of a size greater than or equal to the size shown below					
	0.1 μ m	0.2 μ m	0.3 μ m	0.5 μ m	1 μ m	5 μ m
ISO 1	10	2				
ISO 2	100	24	10	4	x	-
ISO 3	1,000	237	102	35	8	-
ISO 4	10,000	2,370	1,020	352	83	-
ISO 5	100,000	23,700	10,200	3,520	832	29
ISO 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7	-	-	-	352,000	83,200	2,930
ISO 8	-	-	-	3,520,000	832,000	29,300
ISO 9	-	-	-	35,200,000	8,320,000	293,000

$C = 10N(0.1/D)2.08$ part / m³

US Fed Std 209 E (1992)

	Maximum permissible concentrations (particles/m ³ of air) of particles of a size greater than or equal to the size shown below					
	0.1 μ m	0.2 μ m	0.3 μ m	0.5 μ m	1 μ m	5 μ m
M 1	-	350	75.7	30.9	10.0	-
M 1.5	1	1,240	265	106	35.3	-
M 2	-	3,500	757	309	100	-
M 2.5	10	12,400	2,650	1,060	353	-
M 3	-	35,000	7,570	3,090	1,000	-
M 3.5	100	-	26,500	10,600	3,530	-
M 4	-	-	75,700	30,900	10,000	-
M 4.5	1000	-	-	-	35,300	247
M 5	-	-	-	-	100,000	618
M 5.5	10,000	-	-	-	353,000	2,470
M 6	-	-	-	-	1,000,000	6,180
M 6.5	100,000	-	-	-	3,530,000	24,700
M 7	-	-	-	-	10,000,000	61,800

particles / m³ = $10M(0.5/d)^2 \cdot 2$

particles / ft³ = $Nc(0.5/d)^2 \cdot 2$

Air-conditioning / Comfort

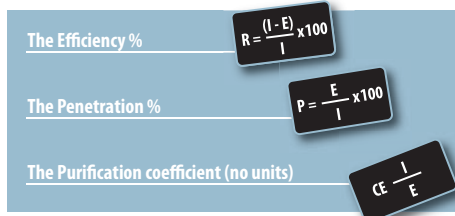
Air quality of premises with non specific pollution

Regulatory aspect		Recommendations
Labour code / Circular of application of decrees 84/1093-1094 dated 7/12/1984		UNICLIMA Air-conditioning & Health guide (1993)
Fresh air	Labour code Art. R235.2.6 Minimum arrestance efficiency 90% (G4 according to EN 779:2002)	Air-conditioning system inlet: 85% opacimetric (F7 according to EN 779:2002) Air-conditioning system outlet: 90% opacimetric (F8 according to EN 779:2002)
Recycled air	Labour code Art. R232.5.4 Minimum opacimetric efficiency 50% (F5 according to EN 779:2002)	85% opacimetric (F7 according to EN 779:2002)

Standards, Regulations and Recommendations

FILTER ENGINEERING - Calculations

An air filter's efficiency is expressed in 3 forms:



Clearly the purification

Clearly the purification coefficient is the most representative expression for high levels of filtration. E.g.:

Efficiency 99.995 % : CE of 20,000

Efficiency 99.9998 % : CE of 500 000

The second filter is 25 times more efficient than the first.

Nota: I = particle concentration upstream E = particle concentration downstream

Conversion table (%)

Efficiency	Penetration	Purification Coefficient	Efficiency	Penetration	Purification Coefficient
95	5	20	99.99	0.01	10,000
99	1	100	99.995	0.005	20,000
99.5	0.5	200	99.999	0.001	100,000
99.9	0.1	1,000	99.9995	0.0005	200,000
99.95	0.05	2,000	99.9999	0.0001	1,000,000
99.97	0.03	3 333	99.99995	0.00005	2,000,000
99.98	0.02	5 000	99.99999	0.00001	10,000,000

Comperative efficiencies

		on 1 μm			on 0.5 μm		
		E	P	PC	E	P	PC
90%	ARRESTANCE	10%	90%	1.1	5%	95%	1.05
50%	EFFICIENCY	30%	70%	1.4	10%	90%	1.1
65%	EFFICIENCY	45%	55%	1.8	25%	75%	1.3
85%	EFFICIENCY	85%	15%	6.6	70%	30%	3.3
95%	EFFICIENCY	95%	5%	20	90%	10%	10
95%	0.3 μm	≥ 98%	< 2%	≥100	≥98%	<2%	≥ 50

E = Efficiency, P = Penetration, PC = Purification Coefficient

Operating life

An air filter's operating life is not directly proportional to its useful filtering surface. It is much better to opt for a model comprising 50% additional surface. This increases its operating life by 100%, not 50%!

Actual case study

Filter model	Effective filtering surface	Initial pressure drop at 3600m³/h	Operating life*
Hi-Flo 3P 85	6.5 m²	120 Pa	3.500 hours
Hi-Flo 3M 85	9.4 m²	100 Pa	6.500 hours

* Determined using the Camfil Farr calculation charts in the Hi-Flo brochure, for an average town environment

** factor of increase

Actual case study

Filter model	Effective filtering surface	Initial pressure drop at 3600m³/h	Operating life*
Gain	3 m²	20 Pa	3.000 hours
Outcome	+ 46% in surface (x1.5)**	- 17% in energy	+ 86% in operating life (x 1.9)**

* Determined using the Camfil Farr calculation charts in the Hi-Flo brochure, for an average town environment

** factor of increase

Energy costs

Energy consumed by an air filter due to its pressure drop:

q = flow rate (m³/s)

dP = pressure drop (Pa)

h = operating period (hours)

ef = fan efficiency (generally 0.6 to 0.7)

$$E = \frac{q \times dP \times h}{e_f \times 1000} = \text{kWh}$$

Conversions

Speed			
m/s = 3.6 km/h	1 km/h = 0.278 m/s	1 ft/min = 0.00508 m/s	1 m/s = 196.85 ft/min
Length			
1 mile = 1.609 km	1 km = 0.621 mile	1 yd = 0.914 m	1 m = 1.09 yd
1 ft = 0.305 m	1 m = 3.28 ft	1 in = 25.4 mm	1 mm = 0.039 in
1 mm = 1.000 µm	1 µm = 0.001 mm	1 µm = 1.000 nm	1 nm = 0.001 µm
1 µm = 10,000 Å	1 Å = 0.0001 µm		
Surface			
1 ft² = 0.0929 m²	1 m² = 10.8 ft²	1 in² = 6.45 cm²	1 cm² = 0.155 in²
Volume			
1 ft³ = 0.0283 m³	1 m³ = 35.3 ft³	1 ft³ = 28.3 litres	
Flow rate			
1 cfm = 0.472.10 - 3 m³/s	1 m³/s = 3 600 m³/h	1 m³/h = 0.278.10 - 3 m³/s	
1 cfm = 1.699 m³/h	1 m³/s = 2 120 cfm		
Weight			
1 lb = 0.454 kg	1 kg = 2.20 lb	1 oz = 28.3 g	1 g = 0.0352 oz
Force			
1 kgf = 9.80665 N	1 N = 0.102 kgf	1 lbf = 4.45 N	1 N = 0.225 lbf
Pressure			
1 mmCE = 9.81 Pa	1 Pa = 0.102 mmCE	1 kPa = pz	1 kPa = 10.2 g/cm²
1 kg/cm² = 0.980665 bar	1 bar = 1.02 kg/cm²	1 kg/m² = 98.0665 kPa	1 kPa = 0.00987 atm
1 psi = 6.89 kPa	1 bar = 101325 Pa	1 atm = 101.325 kPa	1 mb = 100 Pa
1 mmCE = 1 kg/m²	1 kPa = 0.145 psi	1 Pa = 1 N/m²	1 in w.g. = 250 Pa
Energy			
1 kgm = 9.80665 J	1 J = 0.102 kgm	1 cal = 4.184 J	1 J = 0.239 cal
1 kWh = 3.6 MJ	1 MJ = 0.278 kWh	1 Btu = 1.055 kJ	1 J = 0.945.10-3 Btu
Power			
1 CV = 0.736	1 kW = 1.36 CV	1 kcal/h = 1.16 W	1 W = 0.860 kcal/h
1 Btu/h = 0.292 W	1 W = 3.42 Btu/h		

Temperature: conversion formulae

0 °C = 32 °F	0 °F = -17.8 °C
0 °F = (9/5) x °C	+32 °C = (5/9) x °F - 17.8

Temperature: conversion table

°F	°C	°F	°C	°F	°C	°F	°C
0	-17,8	30	-1,1	50	10,0	80	26,7
10	-12,2	32	0	60	15,6	90	32,2

Standards, Regulations and Recommendations

Temperature: conversion table

°F	°C	°F	°C	°F	°C	°F	°C
20	-6.7 4	0	4.4	70	21.1	100	37.8

Energy

Energy

$$1 \text{ kcal/kg} = 4.19.103 \text{ J/kg} \quad 1 \text{ J/kg} = 0.239.10^{-3} \text{ kcal/kg}$$

Heat transmission

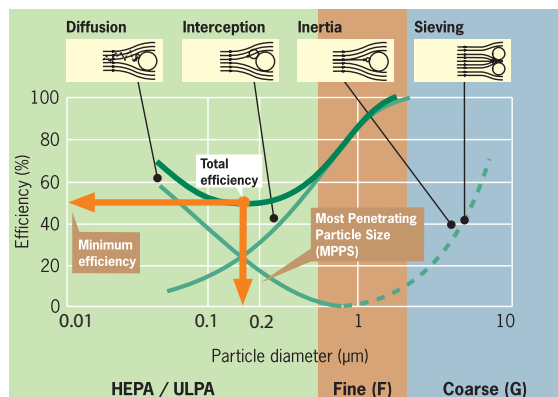
$$1 \text{ kcal/h.m}^2.\text{°C} = 1.16 \text{ W/(m}^2.\text{°C)} \quad 1 \text{ W/(m}^2.\text{°C)} = 0.86 \text{ kcal/h.m}^2.\text{°C}$$

$$1 \text{ Btu/(h.ft}^2.\text{°F)} = 5.64 \text{ W/(m}^2.\text{°C)} \quad 1 \text{ W/(m}^2.\text{°C)} = 0.177 \text{ Btu/(h.ft}^2.\text{°F)}$$

Filter Engineering - Theory

MPPS

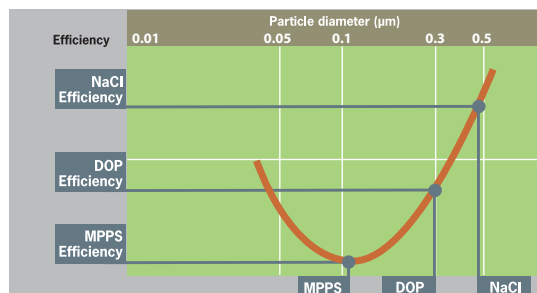
Minimum efficiency of air filters



The overall efficiency of an air filter is the result of a combination of 4 basic filtration mechanisms (sieving, inertia, interception and diffusion), so that the efficiency curve of an air filter adopts a characteristic V shape showing a minimum level of efficiency. This minimum efficiency corresponds to a particle size called MPPS (Most Penetrating Particle Size). In other words, the MPPS is the particle size that is the most difficult to stop. The MPPS is situated between 0.1 and 0.2 µm depending on the filter type, and the speed of air flow through the filtering media.

EFFICIENCY TESTS (Not all the tests are equivalent)

MPPS (Most Penetrating Particle Size)



The NaCl test (EUROVENT 4/4)

The NaCl test (EUROVENT 4/4) is less demanding than the DOP test, which in turn is less demanding than the MPPS test

Whitby diagram

Distribution of particles in atmospheric air

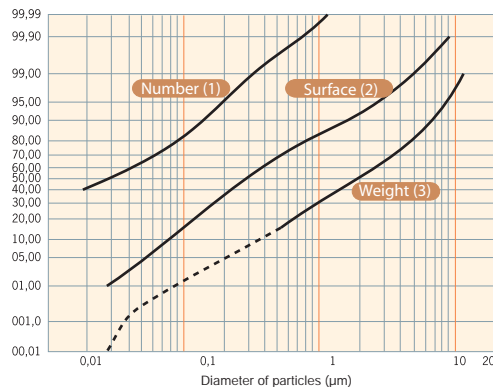
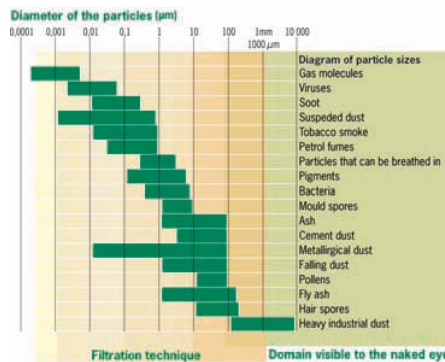


Diagram of Whitby: This diagram shows that more than 99.90% of airborne particles are less than or equal to 1 µm in size.

Therefore, the essential part of air filtration's activity takes place in the invisible domain (human ocular partition power: 30 µm).

Diagram of particle sizes

particle sizes



Filter Industry Definitions

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.).
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.

Filter Industry Definitions

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.
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.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

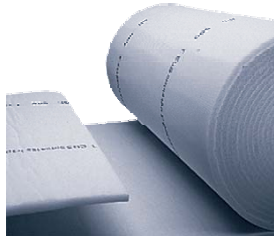
Filter Industry Definitions

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.
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, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size. 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 - μ	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.

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 watts (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	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 mechanical 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.

Summary Pre-filtration, Class G3 to F5



Media Rolls

Media Rolls - Filter class G3 to F5
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Media Rolls

Cam Glass Media
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Fan Coil Filters

Fan Coil Filter
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Media Holding Frame (MHF)

Media Holding Frame (MHF)
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Pleated Panel Filters

AeroPleat® III
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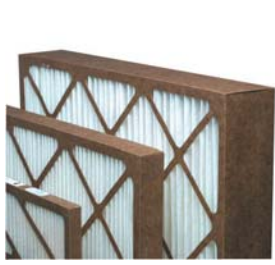
Pleated Panel Filters

30/30®
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Pleated Panel Filters

AP Eleven
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Pleated Panel Filters

30/30® WR
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Primary Bag Filters

Hi-Cap® HF 90/35
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Primary Bag Filters

Hi-Cap® Green HF 90/35
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Metal Filters

airMet Metallfilter
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Metal Filters

Type F/S
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Metal Filters

ECO®Moisture Separator
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Media Rolls

Media Rolls - Filter class G3 to F5



Advantages

- **CM:**
 - Smooth airflow through paint booths
 - Progressively built up thermal bonded polyester fibre
- **CDM 600:**
 - Thermal bonded polyester fibre
 - Enhances laminar air flow patterns
 - Treated with special adhesive to prevent dust loss due to vibration

Application: CM: For use as a prefilter in air conditioning, and spraybooth ventilation
 CDM: For fine filtration in air conditioning devices and installations, particularly final filtration in Automotive spraybooths and drying cabinets.

Media: CM: Synthetic, CDM: Polyester fibre.

EN 779:2002 filter class: G3, G4, F5.

ASHRAE 52.2:2007 filter class: MERV 6, MERV 7, MERV 10.

Arrestance efficiency: 85% - 92% for CM, 95% for CDM.

Temperature: 80°C - 100°C maximum in continuous service.

Fire rating: DIN 53438 class F1 for CM, UL 900 for CDM.

Reference	Model	Dimensions (m)	Filter Classification EN 779:2002	Pressure drop at 1m/s velocity Pa	Unit Volume m ³
5200003	CM355	2 x 20	G3	1.0/30	0.4
5200006	CM360	2 x 20	G4	1.0/45	0.4
5200013	Camtex CDM600	2.0 x 20	F5	1.0/85	0.8
5200015	Camtex CDM600	1.7 x 20	F5	1.0/85	0.7

Media Rolls

Cam Glass Media



Advantages

- Continuous filament glass fibres, resin bonded
- Full depth particle collection
- Smooth airflow through paint booths
- Economical

Application: For use as a prefilter in air conditioning, and spraybooth extract systems.

Media: Glass Fibre.

EN 779:2002 filter class: G3.

ASHRAE 52.2:2007 filter class: MERV 6.

Arrestance efficiency: 85%.

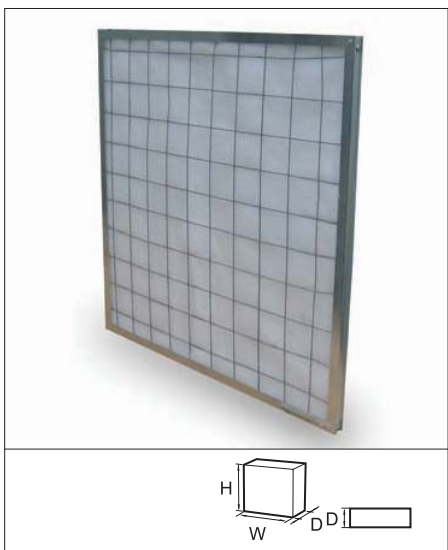
Recommended final pressure drop: 200 Pa.

Temperature: 120°C maximum in continuous service.

Fire rating: DIN 53438 class F1.

Reference	Model	Dimensions (m)	Filter Classification EN 779:2002	Pressure drop at 1m/s velocity Pa	Unit Volume m ³
5200012	Paintstop rolls	1 x 20	G3	1.0/12	0.20

Fan Coil Filter



Advantages

- Protection via 2 grids
- Progressively built-up thermal bonded polyester fibre
- Ultra compact

Application: Prevention of dust and dirt build up on heating/cooling coils within ventilation systems.

Type: Prefilter.

Frame: Mill-finished aluminium profile.

Media: Polyester fibre.

EN 779:2002 filter class: G3, G4.

ASHRAE 52.2:2007 filter class: MERV 6, MERV 7.

Recommended final pressure drop: 250 Pa.

Temperature: 80°C - 100°C maximum in continuous service.

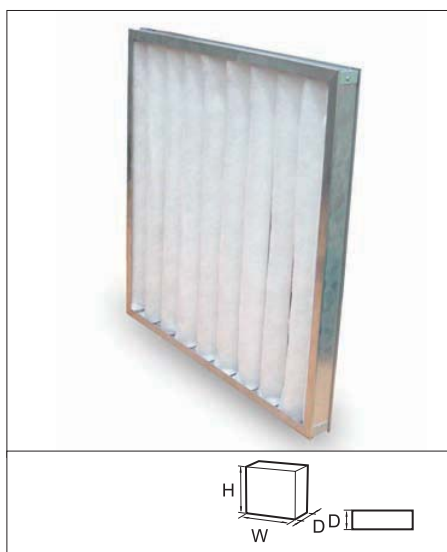
Holding frame: Type 8.

Fire rating: DIN 53438 class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
5404501	FCF 24x24x1-G3	597 x 597 x 22	G3	0.356	3400/115	0.735	0.01
5404511	FCF 24x12x1-G3	292 x 597 x 22	G3	0.174	1700/144	0.43	0.005
5404001	FCF 24x24x1-G4	597 x 597 x 22	G4	0.356	3400/140	0.77	0.01
5404002	FCF 24x12x1-G4	292 x 597 x 22	G4	0.174	1700/190	0.46	0.005

Media Holding Frame (MHF)

Media Holding Frame (MHF)



Advantages

- Suitable for high humidity conditions
- Progressively built-up thermal bonded polyester fibre
- Replaceable filter media

Application: Prefiltration of dust and dirt on air handling units.

Type: Nonwoven media, pleated with a wire support grid.

Frame: Mill-finished aluminium profile.

Media: Polyester fibre.

EN 779:2002 filter class: G3, G4.

ASHRAE 52.2:2007 filter class: MERV 6, MERV 7.

Recommended final pressure drop: 250 Pa.

Temperature: 80°C - 100°C.

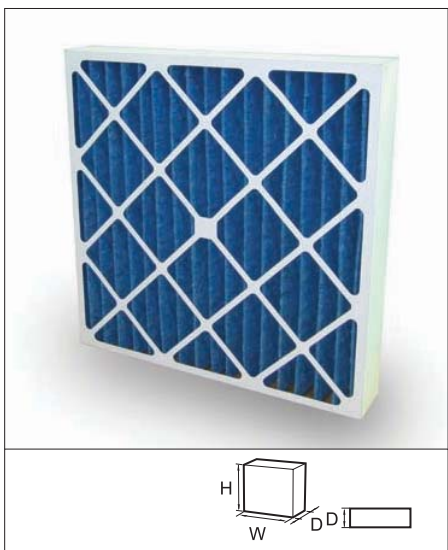
Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: DIN 53438 class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
5402501	MHF 24x24x2-G3	594 x 594 x 46	G3	0.57	3400/103	1.35	0.018
5402502	MHF 12x24x2-G3	289 x 594 x 46	G3	0.3	1700/149	0.77	0.009
5402001	MHF 24x24x2-G4	594 x 594 x 46	G4	0.57	3400/113	1.35	0.018
5402002	MHF 12x24x2-G4	289 x 594 x 46	G4	0.3	1700/161	0.77	0.009

Pleated Panel Filters

AeroPleat® III



Advantages

- Moisture resistant cardboard frame
- Fully supported media bonded onto a wire support grid
- Comprehensive range of standard and non standard sizes
- Robust construction
- Bonded into case to eliminate air by-pass

Application: Prefilter for comfort air conditioning applications.

Type: Disposable pleated panel filter.

Frame: Moisture resistant cardboard.

Media: Mixture of cotton and synthetic fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 8.

Recommended final pressure drop: 250 Pa.

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

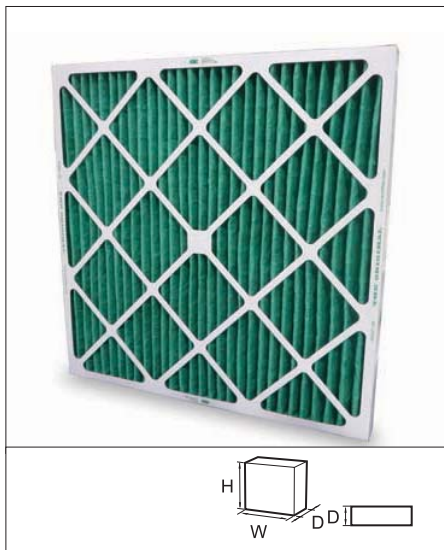
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Airflow / pressure drop m ³ / hr / Pa	Media area m ²	Unit Weight kg	Unit Volume m ³
116300001	Aeropleat III Class 2 20x16x2	394 x 495 x 44	G4	1887/58	0.60	0.4	0.01
116300002	Aeropleat III Class 2 20x20x2	495 x 495 x 44	G4	2363/58	0.80	0.5	0.01
116300003	Aeropleat III Class 2 25x20x2	495 x 622 x 44	G4	2958/58	1.00	0.6	0.01
116300004	Aeropleat III Class 2 25x16x2	394 x 622 x 44	G4	2363/58	0.73	0.5	0.01
116300005	Aeropleat III Class 2 24x24x2	594 x 594 x 44	G4	3400/58	1.13	0.65	0.02
116300006	Aeropleat III Class 2 24x12x2	289 x 594 x 44	G4	1700/58	0.57	0.35	0.01
116300007	Aeropleat III Class 2 24x20x2	495 x 594 x 44	G4	2839/58	0.96	0.55	0.01
116300008	Aeropleat III Class 2 24x18x2	444 x 594 x 44	G4	2550/58	0.85	0.5	0.01
116307001	Aeropleat III Class 2 24x24x4	594 x 594 x 95	G4	3400/53	2.11	1.2	0.03
116307002	Aeropleat III Class 2 24x12x4	289 x 594 x 95	G4	1700/53	1.05	0.65	0.03
116307003	Aeropleat III Class 2 20x20x4	492 x 492 x 95	G4	2363/53	1.46	0.9	0.02
116307004	Aeropleat III Class 2 20x16x4	390 x 492 x 95	G4	1887/53	1.17	0.75	0.02
116307005	Aeropleat III Class 2 25x16x4	390 x 619 x 95	G4	2363/53	1.46	0.9	0.03
116307007	Aeropleat III Class 2 24x20x4	492 x 594 x 95	G4	2839/53	1.76	1.05	0.03

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Pleated Panel Filters

30/30®



Advantages

- High mechanical strength
- Fully supported media bonded onto a wire support grid
- Rigid, water resistant cardboard frame
- Large media surface
- Media bonded into frame to eliminate air bypass
- Unique radial pleat design

Application: Primary filter for air conditioning systems.

Type: High performance disposable pleated panel filter.

Frame: Rigid water resistant cardboard.

Media: Mixture of cotton and synthetic fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 8.

Recommended final pressure drop: 250 Pa.

Temperature: 70°C maximum in continuous service.

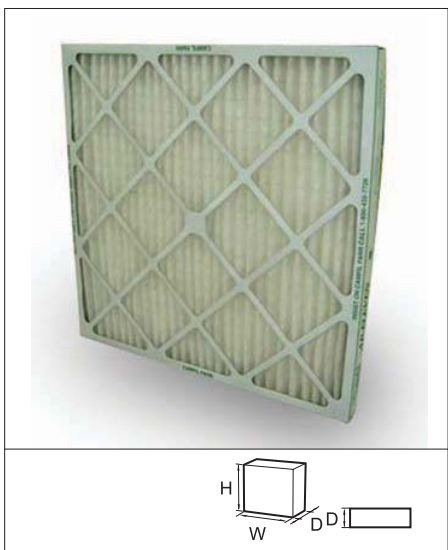
Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
54862001	30/30 2 20x16x1	394 x 495 x 22	G4	0.50	1326/58	0.3	0.006
54862002	30/30 2 20x20x1	495 x 495 x 22	G4	0.61	1649/58	0.4	0.007
54862003	30/30 2 25x20x1	495 x 622 x 22	G4	0.74	2066/58	0.55	0.008
54862004	30/30 2 25x16x1	394 x 622 x 22	G4	0.62	1649/58	0.42	0.007
54862005	30/30 2 24x24x1	594 x 594 x 22	G4	0.91	2380/58	0.6	0.010
54862010	30/30 2 24x12x1	289 x 594 x 22	G4	0.46	1190/58	0.3	0.005
54862011	30/30 2 24x20x1	495 x 597 x 22	G4	0.74	1981/58	0.53	0.008
49880001	30/30 2 20x16x2	394 x 495 x 44	G4	0.92	1870/78	0.44	0.011
49880002	30/30 2 20x20x2	495 x 495 x 44	G4	1.11	2363/78	0.55	0.013
49880003	30/30 2 25x20x2	495 x 622 x 44	G4	1.39	2958/78	0.7	0.017
49880004	30/30 2 25x16x2	394 x 622 x 44	G4	1.15	2363/78	0.55	0.014
49880005	30/30 2 24x24x2	594 x 594 x 44	G4	1.61	3400/78	0.78	0.019
49880006	30/30 2 24x12x2	289 x 594 x 44	G4	0.78	1700/78	0.4	0.010
49880009	30/30 2 20x14x2	343 x 495 x 44	G4	0.77	1658/78	0.25	0.010
49880012	30/30 2 24x20x2	495 x 594 x 44	G4	1.33	2839/78	0.45	0.016
49880015	30/30 2 24x18x2	444 x 594 x 44	G4	1.21	2550/78	0.45	0.014
49880017	30/30 2 24x16x2	394 x 594 x 44	G4	1.10	2270/78	0.55	0.014
59413001	30/30 2 24x24x4	594 x 594 x 95	G4	2.58	3400/68	1.45	0.039
59413002	30/30 2 24x12x4	289 x 594 x 95	G4	1.29	1700/68	0.6	0.019
59413003	30/30 2 20x20x4	492 x 492 x 95	G4	1.76	2363/68	0.3	0.027
59413004	30/30 2 20x16x4	390 x 492 x 95	G4	1.46	1870/68	0.25	0.022
59413005	30/30 2 25x16x4	390 x 619 x 95	G4	1.83	2363/68	0.25	0.027
59413006	30/30 2 25x20x4	492 x 619 x 95	G4	2.19	2958/68	0.45	0.033
59413008	30/30 2 24x20x4	492 x 594 x 95	G4	2.11	2839/68	0.45	0.031
59413010	30/30 2 25x25x4	619 x 619 x 95	G4	2.79	3689/68	0.5	0.044

Plated Panel Filters

AP Eleven



Advantages

- Lowest cost of ownership for a F5 filter in a pleated panel design
- High capacity dust loading for a longer life than standard pleated filters
- High wet-strength beverage board frame
- Available in 2" and 4" depths

Description: High efficiency F5 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.

EN 779:2002 filter class: F5.

ASHRAE 52.2:2007 filter class: MERV 10.

Media: Synthetic fibers in a uniform lofted media blanket.

Recommended final pressure drop: 250 Pa.

Temperature: Maximum continuous operating temperature of 70° C.

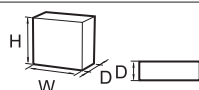
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
404434001	AP Eleven 20x16x2	394 x 495 x 44	F5	0.910	1887/63	0.44	0.01
404434002	AP Eleven 20x20x2	495 x 495 x 44	F5	1.087	2363/63	0.49	0.01
404434003	AP Eleven 25x20x2	495 x 622 x 44	F5	1.366	2958/63	0.63	0.01
404434004	AP Eleven 25x16x2	394 x 622 x 44	F5	1.143	2363/63	0.49	0.01
404434005	AP Eleven 24x24x2	594 x 594 x 44	F5	1.607	3400/63	0.68	0.02
404434006	AP Eleven 24x12x2	289 x 594 x 44	F5	0.771	1700/63	0.40	0.01
404434007	AP Eleven 24x20x2	495 x 594 x 44	F5	1.310	2839/63	0.58	0.01
404434008	AP Eleven 24x18x2	444 x 594 x 44	F5	1.198	2550/63	0.54	0.01
404435001	AP Eleven 24x24x4	594 x 594 x 95	F5	2.555	3400/58	1.25	0.03
404435002	AP Eleven 24x12x4	289 x 594 x 95	F5	1.282	1700/58	0.67	0.02
404435003	AP Eleven 20x20x4	492 x 492 x 95	F5	1.747	2363/58	0.87	0.02
404435004	AP Eleven 20x16x4	390 x 492 x 95	F5	1.449	1887/58	0.69	0.02
404435005	AP Eleven 25x16x4	394 x 622 x 95	F5	1.814	2363/58	0.91	0.02
404435006	AP Eleven 25x20x4	495 x 622 x 95	F5	2.183	2958/58	1.1	0.03
404435007	AP Eleven 24x20x4	492 x 594 x 95	F5	2.093	2839/58	1.04	0.03

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Pleated Panel Filters

30/30® WR



Advantages

- Two-in-one performance - keeps out water and dirt.
- Large media surface
- A multi-layered non-cellulose media, repels water, captures dust, lint, pollen and other particulate contaminants.
- Media bonded to the frame to eliminate air bypass
- Water resistant beverage board frame

Applications: Primary filter for medium efficiency applications.

Type: High performance pleated panel filter.

Frame: High strength moisture resistant beverage board.

Media: Glass fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 7.

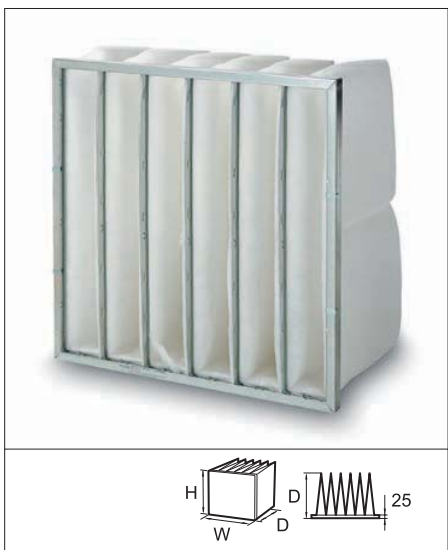
Recommended final pressure drop: 250 Pa.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Volume m ³
125343005	30/30 WR 24x24x2	595 x 595 x 44	G4	2.61	3400/63	0.02
125343006	30/30 WR 24x12x2	289 x 595 x 44	G4	1.27	1700/63	0.01
402137001	30/30 WR 24x24x4	595 x 595 x 95	G4	4.24	3400/55	0.03
402137002	30/30 WR 24x12x4	289 x 595 x 95	G4	4.24	1700/55	0.02

Primary Bag Filters

Hi-Cap® HF 90/35



Advantages

- Rigid self supporting pockets
- Robust metal header frame
- High mechanical strength
- Welded pocket construction
- High dust holding capacity

Application: Comfort air conditioning applications, prefilter applications.

Type: Multi pocket bag filter.

Case: Galvanised steel.

Media: Polyester fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 7.

Recommended final pressure drop: 250 Pa.

Temperature: 70°C maximum in continuous service.

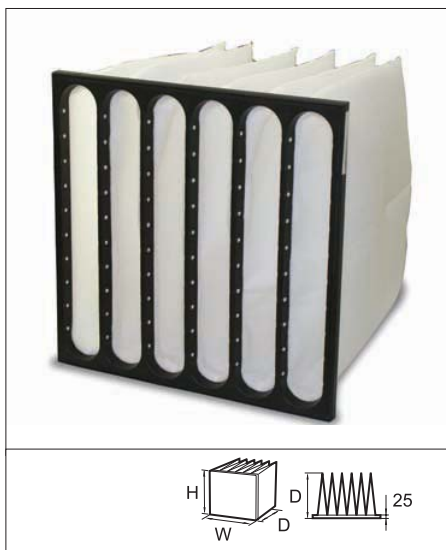
Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: DIN 53438 class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3200005	HF 90/35-66	592 x 592 x 360	G4	6	2.6	3400/50	2.2	0.04
3200006	HF 90/35-56	490 x 592 x 360	G4	5	2.2	2800/50	2	0.04
3200007	HF 90/35-36	287 x 592 x 360	G4	3	1.3	1700/50	1.4	0.02
3200008	HF 90/35-55	490 x 490 x 360	G4	5	1.8	2334/50	1.7	0.04
3202009	HF 90/35- 592*592-6*580-66	592 x 592 x 580	G4	6	4.2	3400/30	2.6	0.04
3202033	HF 90/35-66 490*592*580	490 x 592 x 580	G4	5	3.5	2800/30	2.2	0.04
3202016	HF 90/35-287*592-3*580-36	287 x 592 x 580	G4	3	2.0	1700/30	1.5	0.03

Primary Bag Filters

Hi-Cap® Green HF 90/35



Advantages

- Rigid self supporting pockets
- Robust plastic header frame
- High mechanical strength
- Welded pocket construction
- High dust holding capacity
- No metal parts

Application: Comfort air conditioning applications.

Type: Multi pocket bag filter.

Header frame: Plastic.

Media: Polyester fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 7.

Recommended final pressure drop: 250 Pa.

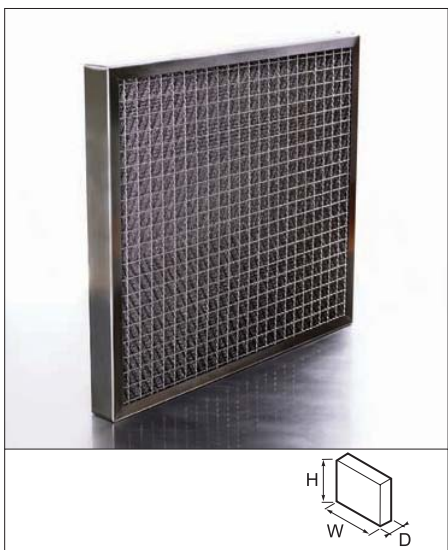
Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3204001	HF Green 90/35-66	592 x 592 x 360	G4	6	2.6	3400/50	2.2	0.04
3204002	HF Green 90/35-56	490 x 592 x 360	G4	5	2.2	2800/50	2	0.04
3204003	HF Green 90/35-36	287 x 592 x 360	G4	3	1.3	1700/50	1.4	0.02

Metal Filters

airMet Metallfilter



Advantages

- The filter cells are made from expanded aluminium woven into a special pattern
- G2 class cleanable dust, sand, flour, paint prefilter.
- Grease and oil filter with very high separation efficiency
- Can be cleaned in dishwasher or pressure washer
- Very large cooling surface without excessive air resistance
- Can be made in custom sizes

Application: Metal filter for grease or oil mist separation. Prefilter for thick particles.

Type: G2 Metal filter and high oil separation efficiency.

Frame: Aluminium EN-AW-6060, ALMG3, stainless steel AISI 304L, acid stainless steel AISI 316L, galvanized.

Media: Woven metal wire mesh. Can be made in aluminium, galvanized, stainless steel or acid stainless steel material.

Faceguard: Aluminium, Hot-dip galvanized expanded metal net or stainless steel grid.

Recommended final pressure drop: 80-120 Pa.

Article number	Material	Size (WxH) mm	Thickness (D) mm
MFAL XXY*	Aluminium	from 100x100 to 750x1500	from 8 to 150
MFFZ XXY*	Galvanized	from 100x100 to 750x1500	from 8 to 150
MFRF XXY*	Stainless steel	from 100x100 to 750x1500	from 10 to 150

From 1 to 8 dm² => **08**

From 8,1 to 12 dm² => **12**

From 12,1 to 16 dm² => **16**

From 16,1 to 18 dm² => **18**

From 18,1 to 25 dm² => **25**

From 25,1 to 30 dm² => **30**

From 30,1 to 36 dm² => **36**

From 36,1 to 43 dm² => **43**

From 43,1 to 50 dm² => **50**

Metal filter can be made in different sizes, shapes and material.

Please contact your local Camfil Farr office.

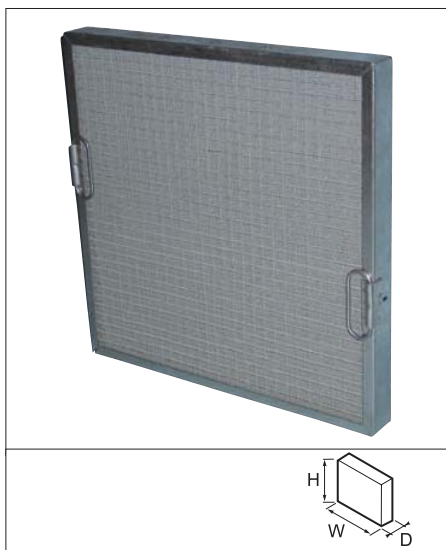
ex: filter size W= 4,55 dm, H= 3,98 dm => surface 18,109 dm²

Thickness: D= 40 mm

Article number for Stainless steel => **MFRF4025**

Metal Filters

Type F/S



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.

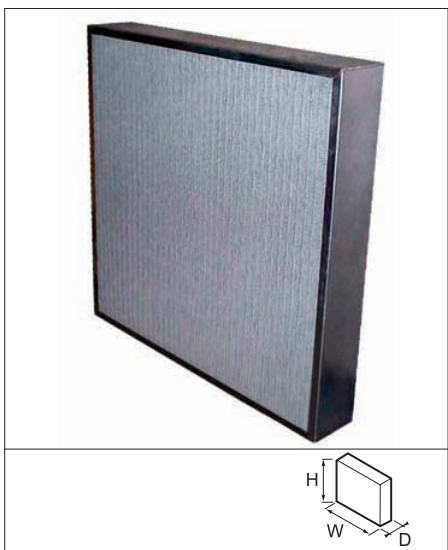
Recommended final pressure drop: 250 Pa when operated at 2.5 m/s. System design may dictate alternative changeout point.

Airflow operating range: Velocity of 2.25 m/s to 2.75 m/s, consult factory outside of this range.

Part Number	Depth (mm)	Nominal Size (HxW) mm	Actual Height (mm)	Actual Width (mm)	Airflow @ Low(m/s)	Airflow @ High (m/s)	Initial Resistance @ Low (Pa)	Initial Resistance @ High (Pa)
037590-001	22	495 x 394	495.3	393.7	1139	1700	10	20
037590-002	22	622 x 394	622.3	393.7	1428	2125	10	20
037590-003	22	495 x 495	495.3	495.3	1428	2125	10	20
037590-004	22	622 x 394	622.3	495.3	1751	2601	10	20
Contact Factory	22	594 x 594	596.9	596.9	2057	3077	10	20
Contact Factory	22	594 x 289	596.9	292.1	1029	1539	10	20
037591-002	44	495 x 394	495.3	393.5	1074	1598	15	27.5
037591-003	44	622 x 394	622.3	393.5	1377	2040	15	27.5
037591-004	44	495 x 495	495.3	495.3	1377	2040	15	27.5
037591-005	44	622 x 495	622.3	495.3	1751	2601	15	27.5
037591-006	44	594 x 594	596.9	596.9	2057	3077	15	27.5
Contact Factory	44	594 x 289	596.9	292.1	1029	1539	15	27.5

Metal Filters

ECO® 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: 250 Pa when operated at 2.5 m/s. System design may dictate alternative changeout point.

Airflow operating range: Velocity of 2.25 m/s to 2.75 m/s, consult factory outside of this range.

Ratings: N/A

Part Number	Application	Nominal Size (HxWxD) mm	Actual Height (mm)	Actual Width (mm)	Rated Airflow (m/s)	Weight (kg)
Galvanized Steel						
064649-001	For built-up banks	594 x 594 x 95	593.85	593.85	3400	8.6
064649-002	For built-up banks	594 x 289 x 95	593.85	289.05	1700	4.5
064649-003	For built-up banks	289 x 594 x 95	289.05	593.85	1700	4.5
064649-004	For side access housings (includes sealing gasket on vertical side)	594 x 594 x 95	593.85	593.85	3400	8.6
064649-005	For side access housings (includes sealing gasket on vertical side)	594 x 289 x 95	593.85	289.05	1700	4.5
064649-006	For side access housings (includes sealing gasket on vertical side)	289 x 594 x 95	289.05	593.85	1700	4.5
Stainless Steel						
098512-001	For built-up banks	594 x 594 x 95	593.85	593.85	3400	8.6
098512-002	For built-up banks	289 x 594 x 95	289.05	593.85	1700	4.5
098512-003	For built-up banks	594 x 289 x 95	593.85	289.05	1700	4.5
098512-004	For side access housings (includes sealing gasket on vertical side)	594 x 594 x 95	593.85	593.85	3400	8.6
098512-005	For side access housings (includes sealing gasket on vertical side)	289 x 594 x 95	289.05	593.85	1700	4.5
098512-006	For side access housings (includes sealing gasket on vertical side)	594 x 289 x 95	593.85	289.05	1700	4.5

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Summary Bag and Compact Filters, Class F5 to F9



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Hi-Flo® P-Series
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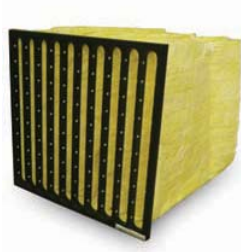
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Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Summary Bag and Compact Filters, Class F5 to F9



High Efficiency Panel

Aiopac® 3GGMHF

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High Efficiency Panel

EcoPleat Green

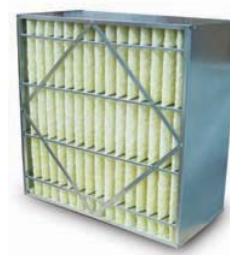
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Pleated Compact Filter

Aiopac® Green

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Pleated Compact Filter

Riga-Flo

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Pleated Compact Filter

Riga-Flo P

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Pleated Compact Filter

3CPM Aeropac

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Pleated Compact Filter

3HCP8 Aeropac

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Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

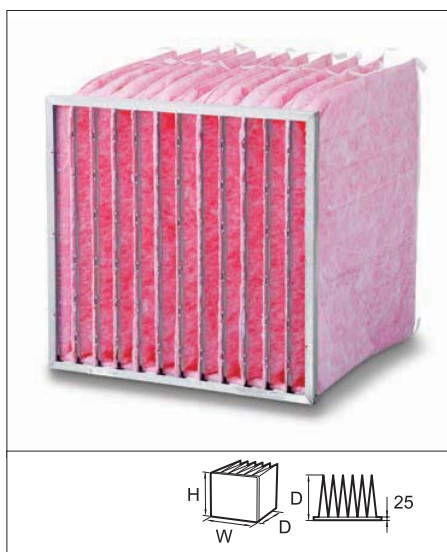
HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

Bag Filters Glass Fibre

Hi-Flo® M-Series



Advantages

- Large surface area
- Saves energy - optimised design (LCC)
- Comprehensive range of standard sizes
- Controlled media spacing (CMS)
- Certified performance

Application: Air conditioning applications.

Type: Extended surface multi pocket bag filter.

Frame: Galvanised steel.

Media: Glass Fibre.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

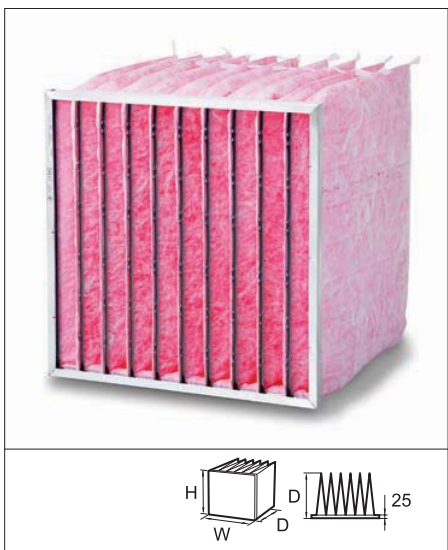
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3100001	M6	592 x 592 x 635	F6	12	9	3400/65	3.30	0.05
3100002	N6	490 x 592 x 635	F6	10	7.4	2800/65	3.00	0.03
3100003	O6	287 x 592 x 635	F6	6	4.6	1700/65	2.00	0.05
3100029	M7	592 x 592 x 635	F7	12	9	3400/85	3.30	0.05
3100030	N7	490 x 592 x 635	F7	10	7.4	2800/85	3.00	0.05
3100031	O7	287 x 592 x 635	F7	6	4.5	1700/85	2.00	0.03
3100057	M8	592 x 592 x 635	F8	12	9	3400/130	3.30	0.05
3100058	N8	490 x 592 x 635	F8	10	7.4	2800/130	3.00	0.05
3100059	O8	287 x 592 x 635	F8	6	4.6	1700/130	1.80	0.03
3105006	M9	592 x 592 x 635	F9	12	9	3400/130	3.30	0.05
3105009	N9	490 x 592 x 635	F9	10	7.4	2800/130	3.00	0.05
3105007	O9	287 x 592 x 635	F9	6	4.6	1700/130	1.80	0.03

* 20mm header frame is available on request.

Bag Filters Glass Fibre

Hi-Flo® P-Series



Advantages

- Large surface area
- Low pressure drop
- Comprehensive range of standard sizes
- Controlled media spacing (CMS)
- Certified performance

Application: Air conditioning applications.

Type: Extended surface multi pocket bag filter.

Frame: Galvanised steel.

Media: Glass Fibre.

EN 779:2002 efficiency: F6, F7, F8, F9.

ASHRAE 52.2:2007 efficiency: MERV 11, MERV 13, MERV 14, MERV 15.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: UL 900.

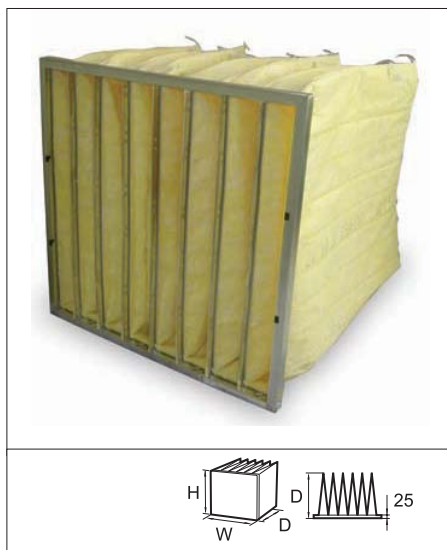
Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
3100009	P6	592 x 592 x 534	F6	10	6.5	3400/70	2.9	0.05
3100010	Q6	490 x 592 x 534	F6	8	5.2	2800/70	2.4	0.05
3100011	R6	287 x 592 x 534	F6	5	3.3	1700/70	1.5	0.03
3100037	P7	592 x 592 x 534	F7	10	6.5	3400/105	2.6	0.05
3100038	Q7	490 x 592 x 534	F7	8	5.2	2800/105	2.4	0.05
3100039	R7	287 x 592 x 534	F7	5	3.3	1700/105	1.6	0.03
3100065	P8	592 x 592 x 534	F8	10	6.5	3400/150	2.4	0.05
3100066	Q8	490 x 592 x 534	F8	8	5.2	2800/145	2.4	0.05
3100067	R8	287 x 592 x 534	F8	5	3.3	1700/140	1.5	0.03
3105008	P9	592 x 592 x 534	F9	10	6.5	3400/150	2.4	0.05
3105010	Q9	490 x 592 x 534	F9	8	5.2	2800/145	2.4	0.05
3105011	R9	287 x 592 x 534	F9	5	3.3	1700/140	1.5	0.03

* 20mm header frame is available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Bag Filters Glass Fibre

Hi-Flo® U-Series



Advantages

- Comprehensive range of standard sizes
- Robust construction
- Large surface area
- High dust holding capacity
- Controlled media spacing (CMS)
- Certified performance

Application: Comfort air conditioning applications, prefilter applications.

Type: Multi pocket bag filter.

Case: Galvanised steel.

Media: Glass Fibre.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8, and FC Housings.

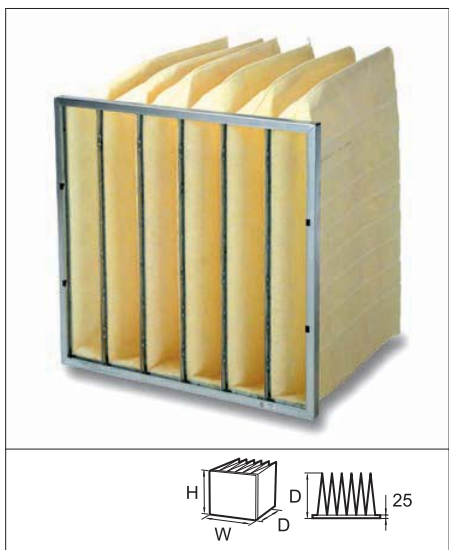
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
3100013	UF6	592 x 592 x 600	F6	8	6	3400/70	2.9	0.05
3100014	UG6	490 x 592 x 600	F6	6	4.5	2800/70	2.4	0.05
3100015	UH6	287 x 592 x 600	F6	4	3	1700/70	1.5	0.03
3100016	3UF-65-55	490 x 490 x 600	F6	6	3.6	2334/70	2	0.05
3100041	UF7	592 x 592 x 600	F7	8	6	3400/115	2.9	0.05
3100042	UG7	490 x 592 x 600	F7	6	4.5	2800/115	2.4	0.05
3100043	UH7	287 x 592 x 600	F7	4	3	1700/115	1.5	0.03
3100044	3UF-85-55	490 x 490 x 600	F7	6	3.6	2334/115	2	0.05
3100069	UF8	592 x 592 x 600	F8	8	6	3400/145	2.9	0.05
3100070	UG8	490 x 592 x 600	F8	6	4.5	2800/145	2.4	0.05
3100071	UH8	287 x 592 x 600	F8	4	3	1700/145	1.5	0.03
3100072	3UF-95-55	490 x 490 x 600	F8	6	3.6	2334/145	2	0.05
3105012	UF9	592 x 592 x 600	F9	8	6	3400/145	2.9	0.05
3105013	UG9	490 x 592 x 600	F9	6	4.5	2800/145	2.4	0.05
3105014	UH9	287 x 592 x 600	F9	4	3	1700/145	1.5	0.03
3105015	3UF-95-55	490 x 490 x 600	F9	6	3.6	2334/145	2	0.05

* 20mm header frame is available on request.

Bag Filters Glass Fibre

Hi-Flo® A-Series



Advantages

- Comprehensive range of standard sizes
- High dust holding capacity
- Robust construction
- Controlled media spacing (CMS)

Application: Comfort air conditioning applications, prefilter applications.

Type: Multi pocket bag filter.

Frame: Galvanised steel.

Media: Glass Fibre.

EN 779:2002 filter class: F5, F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 10, MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8, and FC Housings.

Recommended fire rating: UL 900.

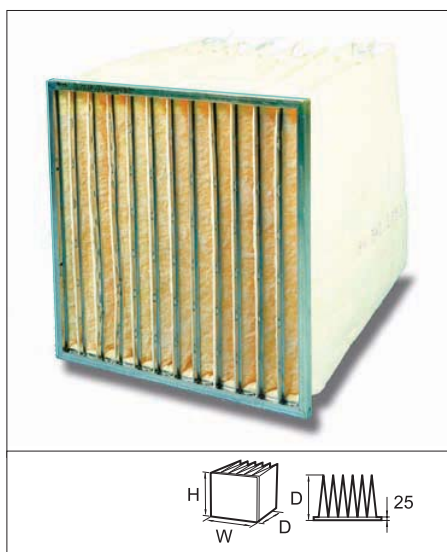
Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
3100085	A5	592 x 592 x 600	F5	6	4.5	3400/55	2.4	0.05
3100086	B5	490 x 592 x 600	F5	5	3.6	2800/55	2.1	0.05
3100087	C5	287 x 592 x 600	F5	3	2.3	1700/55	1.5	0.03
3100017	A6	592 x 592 x 600	F6	6	4.5	3400/80	2.4	0.05
3100018	B6	490 x 592 x 600	F6	5	3.6	2800/85	2.1	0.05
3100019	C6	287 x 592 x 600	F6	3	2.3	1700/80	1.5	0.03
3100045	A7	592 x 592 x 600	F7	6	4.5	3400/150	2.4	0.05
3100046	B7	490 x 592 x 600	F7	5	3.6	2800/155	2.1	0.05
3100047	C7	287 x 592 x 600	F7	3	2.3	1700/150	1.5	0.03
3100073	A8	592 x 592 x 600	F8	6	4.5	2700/175	2.4	0.05
3100074	B8	490 x 592 x 600	F8	5	3.6	2250/180	2.1	0.05
3100075	C8	287 x 592 x 600	F8	3	2.3	1350/170	1.5	0.03

* 20mm header frame is available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Bag Filters Glass Fibre

Hi-Flo® T-Series



Advantages

- Low pressure drop
- Ultra compact
- High dust holding capacity
- Large surface area
- Controlled media spacing (CMS)

Application: Air conditioning applications.

Type: Compact multi-pocket bag filter.

Frame: Galvanised steel.

Media: Glass Fibre.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8, and FC Housings.

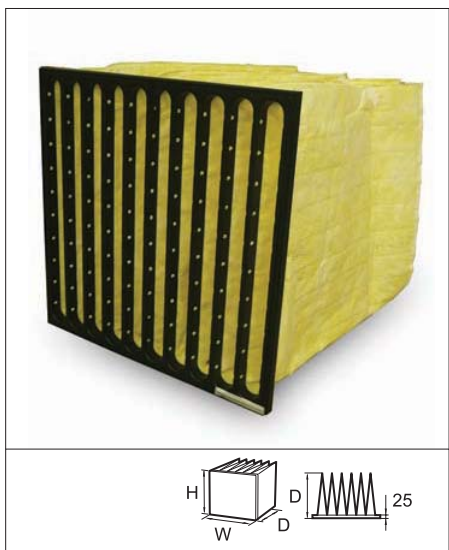
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
3100025	TM6	592 x 592 x 380	F6	12	5.5	3400/90	2.3	0.05
3100026	TN6	490 x 592 x 380	F6	10	4.6	2800/90	2.2	0.05
3100027	TO6	287 x 592 x 380	F6	6	2.7	1700/90	1.4	0.03
3100053	TM7	592 x 592 x 380	F7	12	5.5	3400/130	2.3	0.05
3100054	TN7	490 x 592 x 380	F7	10	4.6	2800/130	2.1	0.05
3100055	TO7	287 x 592 x 380	F7	6	2.7	1700/130	1.4	0.03
3100081	TM8	592 x 592 x 380	F8	12	5.5	3400/205	2.3	0.05
3100082	TN8	490 x 592 x 380	F8	10	4.6	2800/205	2.0	0.05
3100083	TO8	287 x 592 x 380	F8	6	2.7	1700/205	1.4	0.03

* 20mm header frame is available on request.

Bag Filters Glass Fibre

Hi-Flo® Green



Advantages

- Low pressure drop
- Incinerable
- No metal parts
- Certified performance
- Large surface area
- Controlled media spacing (CMS)

Application: Air conditioning applications.

Type: Extended surface multi pocket bag filter.

Header Frame: Plastic.

Media: Glass Fibre.

EN 779:2002 filter class: F5, F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 10, MERV 11, MERV 13, MERV 14, MERV 15.

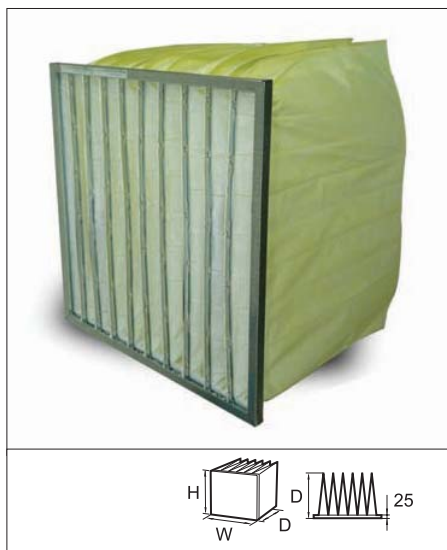
Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3106401	A5	592 x 592 x 600	F5	6	4.5	3400/55	2.4	0.05
3106402	B5	490 x 592 x 600	F5	5	3.6	2800/55	2.1	0.05
3106403	C5	287 x 592 x 600	F5	3	2.3	1700/55	1.5	0.03
3106004	A6	592 x 592 x 600	F6	6	4.5	3400/80	2.4	0.05
3106005	B6	490 x 592 x 600	F6	5	3.6	2800/85	2.1	0.05
3106006	C6	287 x 592 x 600	F6	3	2.3	1700/80	1.5	0.03
3106104	A7	592 x 592 x 600	F7	6	4.5	3400/150	2.4	0.05
3106105	B7	490 x 592 x 600	F7	5	3.6	2800/155	2.1	0.05
3106106	C7	287 x 592 x 600	F7	3	2.3	1700/150	1.5	0.03
3106204	A8	592 x 592 x 600	F8	6	4.5	2700/175	2.4	0.05
3106205	B8	490 x 592 x 600	F8	5	3.6	2250/180	2.1	0.05
3106206	C8	287 x 592 x 600	F8	3	2.3	1350/170	1.5	0.03
3106001	P6	592 x 592 x 534	F6	10	6.5	3400/70	2.9	0.05
3106002	Q6	490 x 592 x 534	F6	8	5.2	2800/70	2.4	0.05
3106003	R6	287 x 592 x 534	F6	5	3.3	1700/70	1.5	0.03
3106101	P7	592 x 592 x 534	F7	10	6.5	3400/105	2.6	0.05
3106102	Q7	490 x 592 x 534	F7	8	5.2	2800/105	2.4	0.05
3106103	R7	287 x 592 x 534	F7	5	3.3	1700/105	1.6	0.03
3106201	P8	592 x 592 x 534	F8	10	6.5	3400/150	2.4	0.05
3106202	Q8	490 x 592 x 534	F8	8	5.2	2800/145	2.4	0.05
3106203	R8	287 x 592 x 534	F8	5	3.3	1700/140	1.5	0.03
3106301	P9	592 x 592 x 534	F9	10	6.5	3400/150	2.4	0.05
3106302	Q9	490 x 592 x 534	F9	8	5.2	2800/145	2.4	0.05
3106303	R9	287 x 592 x 534	F9	5	3.3	1700/140	1.5	0.03

S-Flo P Series



Advantages

- Extended surface multipocket filter
- Comprehensive range of standard sizes
- High efficiency
- Unique pocket design
- Large surface area
- Controlled media spacing (CMS)

Application: Air conditioning applications.

Type: Extended surface multi pocket bag filter.

Case: Galvanised steel.

Media: Synthetic Fibres.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

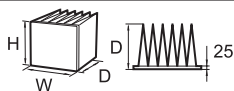
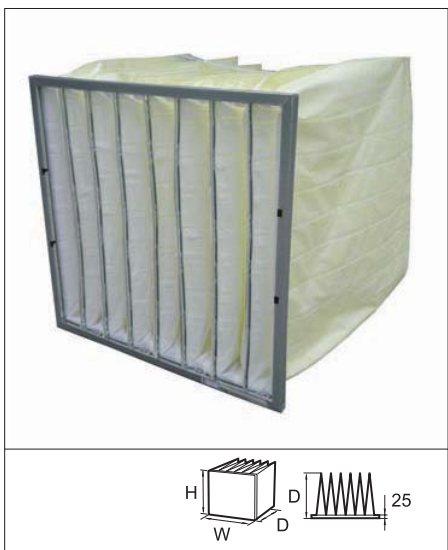
Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3300009	P6	592 x 592 x 534	F6	10	6.5	3400/90	2.7	0.05
3300010	Q6	490 x 592 x 534	F6	8	5.2	2800/90	2.4	0.05
3300011	R6	287 x 592 x 534	F6	5	3.2	1700/90	1.6	0.03
3300033	P7	592 x 592 x 534	F7	10	6.5	3400/115	2.7	0.05
3300034	Q7	490 x 592 x 534	F7	8	5.2	2800/115	2.4	0.05
3300035	R7	287 x 592 x 534	F7	5	3.2	1700/115	1.6	0.03
3300057	P8	592 x 592 x 534	F8	10	6.5	3400/135	2.7	0.05
3300058	Q8	490 x 592 x 534	F8	8	5.2	2800/135	2.4	0.05
3300059	R8	287 x 592 x 534	F8	5	3.2	1700/135	1.6	0.03

* 20mm header frame is available on request.

S-Flo U Series



Advantages

- Multi-pocket bag filter
- Comprehensive range of standard sizes
- Robust metal header frame
- Unique pocket design
- Large surface area
- Controlled media spacing (CMS)

Application: Air conditioning applications.

Type: Extended surface multi pocket bag filter.

Case: Galvanised steel.

Media: Synthetic Fibres.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3300013	UF6	592 x 592 x 600	F6	8	6	3400/75	2.8	0.05
3300014	UG6	490 x 592 x 600	F6	6	4.5	2800/75	2.4	0.05
3300015	UH6	287 x 592 x 600	F6	4	3	1700/75	1.6	0.03
3300037	UF7	592 x 592 x 600	F7	8	6	3400/95	2.8	0.05
3300038	UG7	490 x 592 x 600	F7	6	4.5	2800/95	2.4	0.05
3300039	UH7	287 x 592 x 600	F7	4	3	1700/95	1.6	0.03
3300061	UF8	592 x 592 x 600	F8	8	6	3400/110	2.8	0.05
3300062	UG8	490 x 592 x 600	F8	6	4.5	2800/110	2.4	0.05
3300063	UH8	287 x 592 x 600	F8	4	3	1700/110	1.6	0.03

* 20mm header frame is available on request.

S-Flo A Series



Advantages

- Multi-pocket bag filter
- Unique pocket design
- Comprehensive range of standard sizes
- Available in a range of efficiencies
- Robust metal header frame

Application: Comfort air conditioning applications, prefilter applications.

Type: Multi pocket bag filter.

Case: Galvanised steel.

Media: Synthetic Fibres.

EN 779:2002 filter class: F5, F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 10, MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

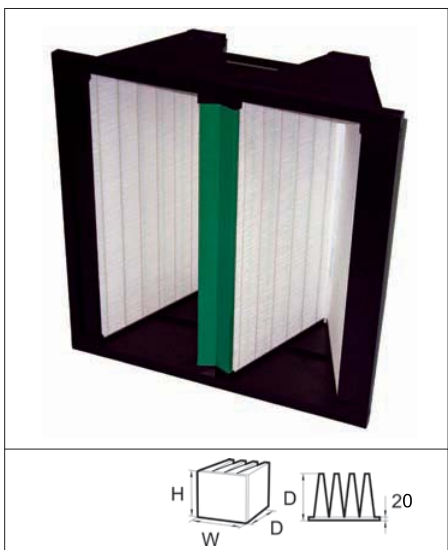
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3300073	A5	592 x 592 x 600	F5	6	4.5	3400/75	2.4	0.05
3300074	B5	490 x 592 x 600	F5	5	3.6	2800/75	2	0.05
3300075	C5	287 x 592 x 600	F5	3	2.3	1700/75	1.5	0.03
3300017	A6	592 x 592 x 600	F6	6	4.5	3400/100	2.4	0.05
3300018	B6	490 x 592 x 600	F6	5	3.6	2800/100	2	0.05
3300019	C6	287 x 592 x 600	F6	3	2.3	1700/100	1.5	0.03
3300041	A7	592 x 592 x 600	F7	6	4.5	3400/110	2.4	0.05
3300042	B7	490 x 592 x 600	F7	5	3.6	2800/110	2	0.05
3300043	C7	287 x 592 x 600	F7	3	2.3	1700/110	1.5	0.05
3300065	A8	592 x 592 x 600	F8	6	4.7	3400/148	2.4	0.05
3300066	B8	490 x 592 x 600	F8	5	3.6	2800/148	2	0.05
3300067	C8	287 x 592 x 600	F8	3	2.3	1700/148	1.5	0.03

* 20mm header frame is available on request.

Compact Filter

Opakfil 2V



Advantages

- Integrity of a rigid minipleat performance in an energy saving lightweight design.
- Incinerable
- Unaffected by varying airflow, excellent for VAV systems
- No metal parts

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.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

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

Frame: ABS.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: Maximum continuous operating temperature of 70° C.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2480001	Opakfil 2V-242412-60	594 x 594 x 280	F6	9.6	3400/65	3.3	0.13
2480002	Opakfil 2V-242012-60	594 x 492 x 280	F6	7.6	2800/65	2.8	0.13
2480003	Opakfil 2V-241212-60	594 x 287 x 280	F6	4.2	1700/74	2.1	0.06
2480004	Opakfil 2V-242412-90	594 x 594 x 280	F7	9.6	3400/109	3.3	0.13
2480005	Opakfil 2V-242012-90	594 x 492 x 280	F7	7.6	2800/112	2.8	0.13
2480006	Opakfil 2V-241212-90	594 x 287 x 280	F7	4.2	1700/129	2.1	0.06
2480007	Opakfil 2V-242412-95	594 x 594 x 280	F8	9.6	3400/140	3.3	0.13
2480008	Opakfil 2V-242012-95	594 x 492 x 280	F8	7.6	2800/143	2.8	0.13
2480009	Opakfil 2V-241212-95	594 x 287 x 280	F8	4.2	1700/165	2.1	0.06

*25mm header frame is available on request.

Compact Filter

Opakfil Green



Advantages

- Light and robust
- Long operating life
- Certified performance optimised for LCC
- Large surface area
- Incinerable
- No metal parts

Application: Air conditioning applications and prefiltration for clean rooms.

Type: High efficiency, incinerable filter.

Frame: ABS.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

Recommended final pressure drop: 450 Pa (suggested economical change point 350 Pa).

Temperature: 70°C maximum in continuous service.

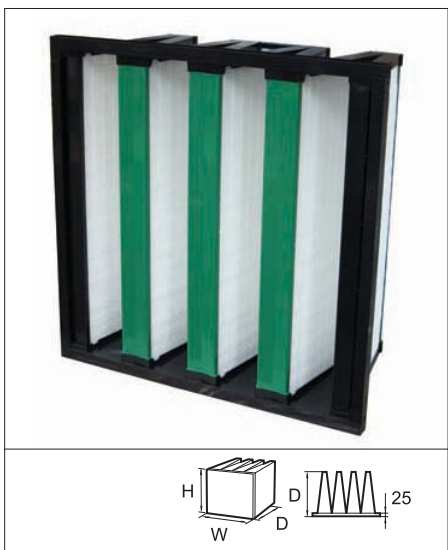
Mounting system: Front and side access housing and frames are available, Type 8 and FC Housings.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2400001	3OPGHF-242412-60	592 x 592 x 290	F6	19	3400/80	5	0.13
2400002	3OPGHF-242012-60	592 x 490 x 290	F6	15	2800/80	4	0.13
2400003	3OPGHF-241212-60	592 x 287 x 290	F6	9	1700/80	3	0.06
2400004	3OPGHF-242412-90	592 x 592 x 290	F7	19	3400/90	5	0.13
2400005	3OPGHF-242012-90	592 x 490 x 290	F7	15	2800/90	4	0.13
2400006	3OPGHF-241212-90	592 x 287 x 290	F7	9	1700/110	3	0.06
2400007	3OPGHF-242412-95	592 x 592 x 290	F8	19	3400/100	5	0.13
2400008	3OPGHF-242012-95	592 x 490 x 290	F8	15	2800/100	4	0.13
2400009	3OPGHF-241212-95	592 x 287 x 290	F8	9	1700/120	3	0.06
2400010	3OPGHF-242412-98	592 x 592 x 290	F9	19	3400/105	5	0.13
2400011	3OPGHF-242012-98	592 x 490 x 290	F9	15	2800/105	4	0.13
2400012	3OPGHF-241212-98	592 x 287 x 290	F9	9	1700/125	3	0.06

Compact Filter

Opakfil CC



Advantages

- Robust construction
- Long operating life
- Light and robust
- Large surface area
- Incinerable
- No metal parts

Application: Air conditioning applications and prefiltration for clean rooms.

Type: High efficiency, incinerable filter.

Frame: ABS.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

Recommended final pressure drop: 450 Pa (suggested economical change point 350 Pa).

Temperature: 70°C maximum in continuous service.

Mounting system: Front and side access housing and frames are available, Type 8 and FC Housings.

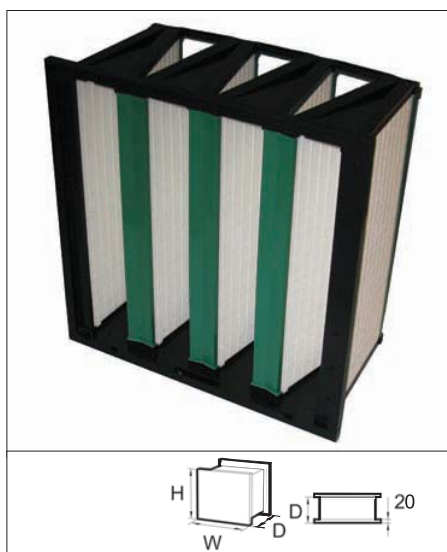
Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2410001	3OPCCHF-242412-60	592 x 592 x 290	F6	14.3	3400/92	5	0.13
2410002	3OPCCHF-242012-60	592 x 490 x 290	F6	11.3	2800/95	4	0.13
2410003	3OPCCHF-241212-60	592 x 287 x 290	F6	6.8	1700/92	3	0.06
2410004	3OPCCHF-242412-90	592 x 592 x 290	F7	14.3	3400/96	5	0.13
2410005	3OPCCHF-242012-90	592 x 490 x 290	F7	11.3	2800/99	4	0.13
2410006	3OPCCHF-241212-90	592 x 287 x 290	F7	6.8	1700/96	3	0.06
2410007	3OPCCHF-242412-95	592 x 592 x 290	F8	14.3	3400/116	5	0.13
2410008	3OPCCHF-242012-95	592 x 490 x 290	F8	11.3	2800/119	4	0.13
2410009	3OPCCHF-241212-95	592 x 287 x 290	F8	6.8	1700/136	3	0.06
2410010	3OPCCHF-242412-98	592 x 592 x 290	F9	14.3	3400/160	5	0.13
2410011	3OPCCHF-242012-98	592 x 490 x 290	F9	11.3	2800/165	4	0.13
2410012	3OPCCHF-241212-98	592 x 287 x 290	F9	6.8	1700/180	3	0.06

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Compact Filter

Durafil® ES



Advantages

- Lowest Life-Cycle Cost (LCC) filter available
- Longest lasting high efficiency filter
- Fine fiber ensures that the filter will maintain efficiency throughout its life in the system
- Lowest initial pressure drop of any ASHRAE grade high efficiency air filter
- Built-in spacer for pleated prefilters

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.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

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

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

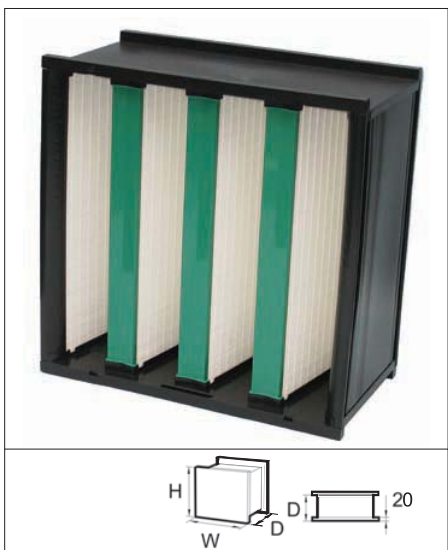
Temperature: Maximum continuous operating temperature of 70° C.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m²	Airflow / pressure drop m³ / hr / Pa
2490001	DU4V-ES-242412-F6	592 x 592 x 315	F6	18.3	3400/55
2490002	DU4V-ES-202412-F6	492 x 592 x 315	F6	15.0	2550/55
2490003	DU4V-ES-122412-F6	289 x 592 x 315	F6	8.3	1700/55
2490004	DU4V-ES-242412-F7	592 x 592 x 315	F7	18.3	3400/70
2490005	DU4V-ES-202412-F7	492 x 592 x 315	F7	15.0	2550/70
2490006	DU4V-ES-122412-F7	289 x 592 x 315	F7	8.3	1700/70
2490007	DU4V-ES-242412-F8	592 x 592 x 315	F8	18.3	3400/73
2490008	DU4V-ES-202412-F8	492 x 592 x 315	F8	15.0	2550/73
2490009	DU4V-ES-122412-F8	289 x 592 x 315	F8	8.3	1700/73
2490010	DU4V-ES-242412-F9	592 x 592 x 315	F9	18.3	3400/105
2490011	DU4V-ES-202412-F9	492 x 592 x 315	F9	15.0	2550/105
2490012	DU4V-ES-122412-F9	289 x 592 x 315	F9	8.3	1700/105

Compact Filter

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
- Lowest initial pressure drop of any dual header box style air filter
- Built-in spacer for pleated prefilters

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.

EN 779:2002 filter class: F6, F7, F8, F9.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14, MERV 15.

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

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

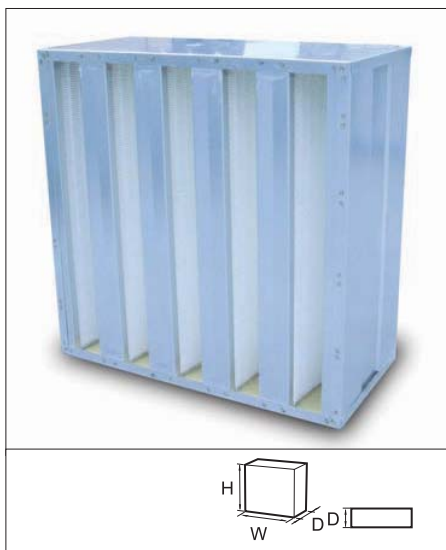
Temperature: Maximum continuous operating temperature of 70° C.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m²	Airflow / pressure drop m³ / hr / Pa
2495001	DU4V-ESB-242412-F6	592 x 592 x 315	F6	18.3	3400/65
2495002	DU4V-ESB-242012-F6	492 x 592 x 315	F6	15.0	2550/65
2495003	DU4V-ESB-241212-F6	289 x 592 x 315	F6	8.3	1700/65
2495004	DU4V-ESB-242412-F7	592 x 592 x 315	F7	18.3	3400/80
2495005	DU4V-ESB-242012-F7	492 x 592 x 315	F7	15.0	2550/80
2495006	DU4V-ESB-241212-F7	289 x 592 x 315	F7	8.3	1700/80
2495007	DU4V-ESB-242412-F8	592 x 592 x 315	F8	18.3	3400/85
2495008	DU4V-ESB-242012-F8	492 x 592 x 315	F8	15.0	2550/85
2495009	DU4V-ESB-241212-F8	289 x 592 x 315	F8	8.3	1700/85
2495010	DU4V-ESB-242412-F9	592 x 592 x 315	F9	18.3	3400/115
2495011	DU4V-ESB-242012-F9	492 x 592 x 315	F9	15.0	2550/115
2495012	DU4V-ESB-241212-F9	289 x 592 x 315	F9	8.3	1700/115

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

OpakAir



Advantages

- Large surface area
- Up to 6000 m³/hr air flow
- Low pressure drop
- Less frequent changes

Application: High air flow air conditioning and process air applications.

Type: High capacity compact filter.

Case: Galvanised steel.

Gasket: Endless polyurethane.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

EN 779:2002 filter class: F7, F8.

ASHRAE 52.2:2007 filter class: MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

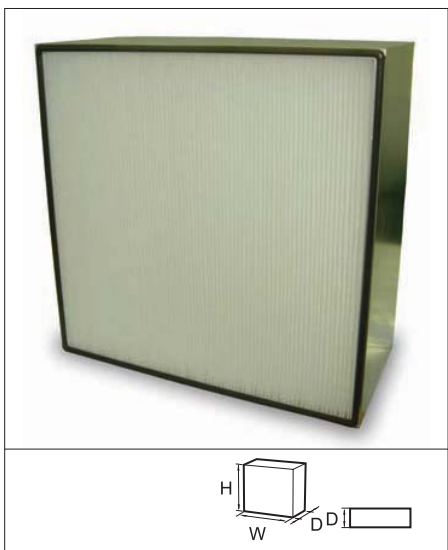
Mounting System: Front and side access housings and safechange systems are available.

Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2420003	Opakair-90	610 x 610 x 292	F7	21.4	4500/105	21	0.13
2420004	Opakair-90	305 x 610 x 292	F7	14	2250/105	12	0.07
2420005	Opakair-95	610 x 610 x 292	F8	21.4	4500/130	21	0.13
2420006	Opakair-95	305 x 610 x 292	F8	8.6	2250/130	12	0.07

High Efficiency Panel

Aiopac® 3GGM



Advantages

- Large surface area
- Savings in operating costs
- Ultra compact
- High dust holding capacity
- Less frequent changes

Application: Air conditioning or industrial processing systems and for mini air conditioning systems, individual modules.

Type: High efficiency compact filter.

Frame: Galvanised steel.

Gasket: Endless polyurethane at inlet.

Media: Glass fibre paper.

Separator: Hot-melt beads.

EN 779:2002 filter class: F6, F7 and F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13 and MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

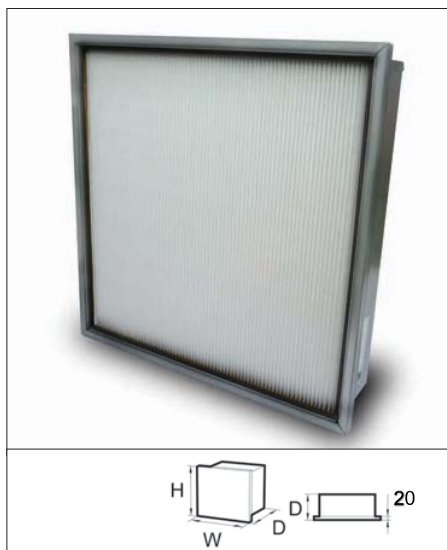
Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
2100001	3GGM-24246-60	610 x 610 x 150	F6	12.3	3400/66	6.8	0.06
2100002	3GGM-20246-60	508 x 610 x 150	F6	10.3	2850/67	5.7	0.06
2100003	3GGM-12246-60	305 x 610 x 150	F6	6.1	1700/68	4	0.03
2100004	3GGM-20206-60	508 x 508 x 150	F6	8.6	2375/67	5	0.06
2100009	3GGM-24246-90	610 x 610 x 150	F7	12.3	3400/100	6.8	0.06
2100010	3GGM-20246-90	508 x 610 x 150	F7	10.3	2850/100	5.7	0.06
2100011	3GGM-12246-90	305 x 610 x 150	F7	6.1	1700/101	4	0.03
2100012	3GGM-20206-90	508 x 508 x 150	F7	8.6	2375/100	5	0.06
2100017	3GGM-24246-95	610 x 610 x 150	F8	12.3	3400/131	6.8	0.06
2100018	3GGM-20246-95	508 x 610 x 150	F8	10.3	2850/132	5.7	0.06
2100019	3GGM-12246-95	305 x 610 x 150	F8	6.1	1700/133	4	0.03
2100020	3GGM-20206-95	508 x 508 x 150	F8	8.6	2375/132	5	0.08

* Other sizes are available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Aiopac® 3GGMHF



Advantages

- Large surface area
- Savings in operating costs
- Ultra compact
- High dust holding capacity
- Less frequent changes

Application: Air conditioning or industrial processing systems and for mini air conditioning systems, individual modules.

Type: High efficiency compact filter.

Frame: Galvanised steel.

Media: Glass fibre paper.

Separator: Hot-melt beads.

EN 779:2002 filter class: F6, F7 and F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13 and MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
2120001	3GGMHF-24245-60	592 x 592 x 135	F6	10.3	3400/86	6.8	0.07
2120002	3GGMHF-20245-60	490 x 592 x 135	F6	8.3	2850/91	5.7	0.07
2120003	3GGMHF-12245-60	287 x 592 x 135	F6	4.5	1700/105	3.8	0.04
2120004	3GGMHF-20205-60	490 x 490 x 135	F6	6.8	2375/94	5	0.07
2120005	3GGMHF-24245-90	592 x 592 x 135	F7	10.3	3400/125	6.8	0.07
2120006	3GGMHF-20245-90	490 x 592 x 135	F7	8.3	2850/131	5.7	0.07
2120007	3GGMHF-12245-90	287 x 592 x 135	F7	4.5	1700/149	3.8	0.04
2120008	3GGMHF-20205-90	490 x 490 x 135	F7	6.8	2375/135	5	0.07
2120009	3GGMHF-24245-95	592 x 592 x 135	F8	10.3	3400/164	6.8	0.07
2120010	3GGMHF-20245-95	490 x 592 x 135	F8	8.3	2850/172	5.7	0.07
2120011	3GGMHF-12245-95	287 x 592 x 135	F8	4.5	1700/195	3.8	0.04
2120012	3GGMHF-20205-95	490 x 490 x 135	F8	6.8	2375/177	5	0.07

* Other sizes are available on request.

High Efficiency Panel

EcoPleat Green



Advantages

- Large surface area
- Long operating life
- Ultra compact
- High dust holding capacity
- Less frequent changes

Application: Air conditioning or industrial processing systems and for mini air conditioning systems, individual modules, ventilation equipment.

Type: High efficiency compact filter.

Frame: Plastic frame.

Media: Wet-laid glass fibre paper.

Separator: Hot melt glue.

Sealant: Polyurethane.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 350 Pa.

Temperature: 70°C.

Relative humidity: 100% RH.

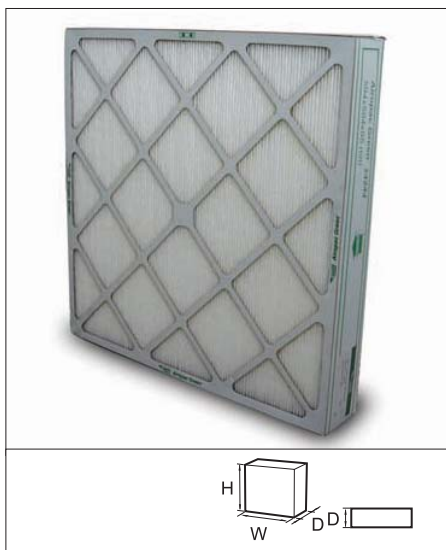
Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2715001	3GPPS-12242-F6	287 x 592 x 48	F6	2.9	950/65	2	0.01
2715002	3GPPS-20242-F6	490 x 592 x 48	F6	4.9	1500/65	2.5	0.015
2715003	3GPPS-24242-F6	592 x 592 x 48	F6	5.9	1900/60	3	0.02
2715004	3GPPS-12242-F7	287 x 592 x 48	F7	2.9	950/90	2	0.01
2715005	3GPPS-20242-F7	490 x 592 x 48	F7	4.9	1500/90	2.5	0.015
2715006	3GPPS-24242-F7	592 x 592 x 48	F7	5.9	1900/90	3	0.02
2715007	3GPPS-12242-F8	287 x 592 x 48	F8	2.9	950/120	2	0.01
2715008	3GPPS-20242-F8	490 x 592 x 48	F8	4.9	1500/120	2.5	0.015
2715009	3GPPS-24242-F8	592 x 592 x 48	F8	5.9	1900/110	3	0.02
2714001	3GPPS-12244-F6	287 x 592 x 96	F6	4.8	1700/90	3	0.02
2714002	3GPPS-20244-F6	490 x 592 x 96	F6	9.9	2800/90	3.5	0.03
2714003	3GPPS-24244-F6	592 x 592 x 96	F6	11.9	3400/90	4	0.04
2714004	3GPPS-12244-F7	287 x 592 x 96	F7	5.8	1700/110	3	0.02
2714005	3GPPS-20244-F7	490 x 592 x 96	F7	9.9	2800/110	3.5	0.03
2714006	3GPPS-24244-F7	592 x 592 x 96	F7	11.9	3400/110	4	0.04
2714007	3GPPS-12244-F8	287 x 592 x 96	F8	5.8	1700/150	3	0.02
2714008	3GPPS-20244-F8	490 x 592 x 96	F8	9.9	2800/150	3.5	0.03
2714009	3GPPS-24244-F8	592 x 592 x 96	F8	11.9	3400/150	4	0.04

* Other sizes are available on request

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Pleated Compact Filter

Airopac® Green



Advantages

- Low pressure drop
- Water resistant beverage board
- Large surface area
- Incinerable
- Rigid design concept
- High dust holding capacity

Application: Air conditioning applications and preparatory filtration in clean rooms.

Type: High efficiency compact filter.

Frame: Rigid water resistance beverage cardboard.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

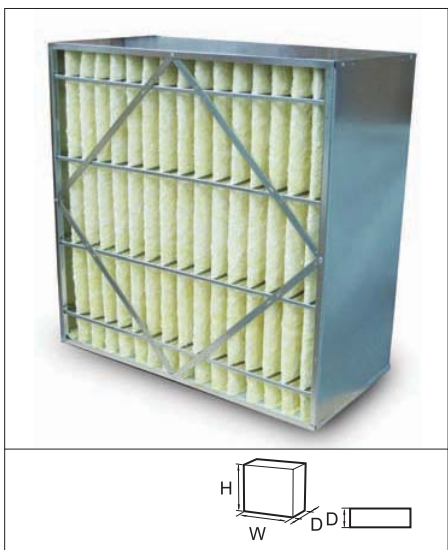
Mounting system: Front and side access housing and frames are available.

Holding frames: Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2700001	3GP-24244-60	594 x 594 x 95	F6	11.8	3400/71	3	0.034
2700002	3GP-20244-60	492 x 594 x 95	F6	9.7	2800/71	2.5	0.028
2700003	3GP-12244-60	289 x 594 x 95	F6	5.7	1700/84	1.6	0.016
2700004	3GP-20204-60	492 x 492 x 95	F6	8	2325/75	2.1	0.023
2700013	3GP-24244-90	594 x 594 x 95	F7	11.8	3400/134	3.1	0.034
2700014	3GP-20244-90	492 x 492 x 95	F7	9.7	2800/134	2.5	0.028
2700015	3GP-12244-90	289 x 594 x 95	F7	5.7	1700/158	1.6	0.016
2700016	3GP-20204-90	492 x 492 x 95	F7	8	2325/142	2.1	0.023
2700025	3GP-24244-95	594 x 594 x 95	F8	11.8	3400/154	3.1	0.034
2700026	3GP-20244-95	492 x 594 x 95	F8	9.7	2800/159	2.5	0.028
2700027	3GP-12244-95	289 x 594 x 95	F8	5.7	1700/179	1.6	0.016
2700028	3GP-20204-95	492 x 492 x 95	F8	8	2325/163	2.1	0.023

Pleated Compact Filter

Riga-Flo



Advantages

- Range of standard sizes
- High efficiency
- Rigid design concept
- Suitable for turbulent airflow

Application: Air conditioning applications.

Type: Rigid pleated filter.

Case: Galvanised steel.

Media: Glass fibre.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
96026001	RF15 CL2 24x24x12	594 x 594 x 292	F6	5.39	3400/73	5.5	0.1
96026005	RF15 CL2 24x12x12	289 x 594 x 292	F6	2.69	1700/73	5.0	0.1
97293001	RF15 CL2 24x24x6	594 x 594 x 149	F6	2.69	2040/60	5.5	0.05
97293005	RF15 CL2 24x12x6	289 x 594 x 149	F6	1.3	1020/60	3.5	0.03
96026002	RF100 CL2 24x24x12	594 x 594 x 292	F7	5.39	3400/125	5.5	0.1
96026006	RF100 CL2 24x12x12	289 x 594 x 292	F7	2.69	1700/125	3.5	0.05
97293002	RF100 CL2 24x24x6	594 x 594 x 149	F7	2.69	2040/103	5.5	0.05
97293015	RF 100 CL2 24x12x6	594 x 292 x 149	F7	2.69	1020/103	5.5	0.03
96026003	RF200 CL2 24x24x12	594 x 594 x 292	F8	5.39	3400/170	5.5	0.1
96026007	RF200 CL2 24x12x12	289 x 594 x 292	F8	2.69	1700/170	3.5	0.05
97293003	RF200 CL2 24x24x6	594 x 594 x 149	F8	2.69	2040/140	5.5	0.05
97293007	RF200 CL2 24x12x6	289 x 594 x 149	F8	1.3	1020/140	3.5	0.03

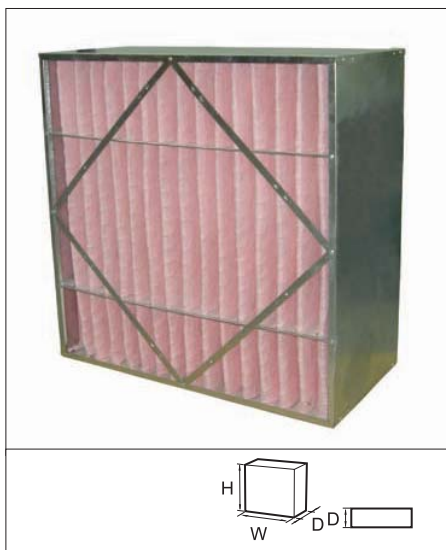
* Other sizes available on request

* PH version available (with header frame)

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Pleated Compact Filter

Riga-Flo P



Advantages

- Range of standard sizes
- High efficiency
- Rigid design concept
- Suitable for turbulent airflow

Application: Air conditioning applications.

Type: Rigid pleated filter.

Frame: Galvanised steel.

Media: Synthetic.

EN 779:2002 filter class: F7, F8.

ASHRAE 52.2:2007 filter class: MERV 13, MERV 14.

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: 70°C maximum in continuous service.

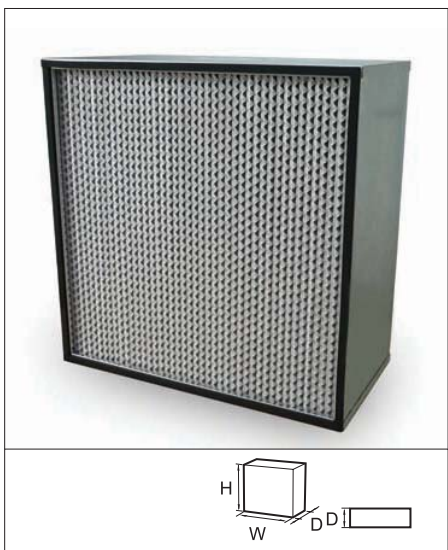
Holding frames: Front and side access housings and frames are available.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
122556003	RFP85 CL2 24x24x12	594 x 594 x 292	F7	5.39	3400/70	7.7	0.1
122556013	RFP85 CL2 24x12x12	289 x 594 x 292	F7	2.6	1700/70	4.55	0.05
122556023	RFP85 CL2 24x20x12	492 x 594 x 292	F7	4.37	2822/70	5.77	0.09
122556033	RFP85 CL2 20x20x12	492 x 492 x 292	F7	3.62	2380/70	5.77	0.07
122556004	RFP95 CL2 24x24x12	594 x 594 x 292	F8	5.39	3400/90	7.7	0.1
122556014	RFP95 CL2 24x12x12	289 x 594 x 292	F8	2.6	1700/90	4.55	0.05
122556024	RFP95 CL2 24x20x12	492 x 594 x 292	F8	4.37	2822/90	5.77	0.09
122556034	RFP95 CL2 20x20x12	492 x 492 x 292	F8	3.62	2380/90	5.77	0.07

Pleated Compact Filter

3CPM Aeropac



Advantages

- Fine fiber ensures that filter maintains its efficiency throughout its life in the system
- High dust holding capacity
- Suitable for variable airflow
- Robust design

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

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

Type: Rigid pleated filter.

Frame: Galvanised steel.

Gasket: Neoprene at inlet.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

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

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

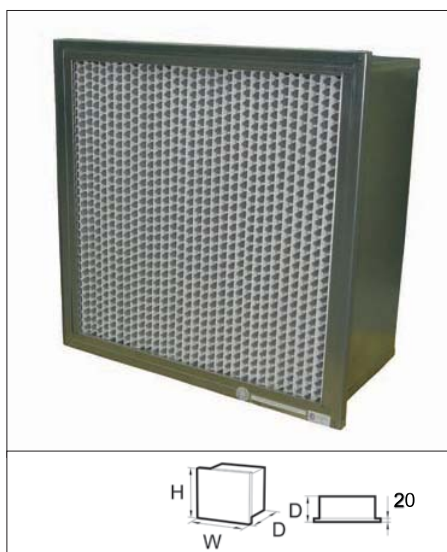
Temperature: 70°C.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2155001	3CPM-65-242412	592 x 592 x 292	F6	12.3	3400/110	8.6	0.1
2155002	3CPM-65-241212	287 x 592 x 292	F6	5.8	1700/110	6.4	0.05
2156001	3CPM-85-242412	592 x 592 x 292	F7	12.3	3400/147	8.6	0.1
2156002	3CPM-85-241212	287 x 592 x 292	F7	5.8	1700/147	6.4	0.05
2157003	3CPM-95-242412	592 x 592 x 292	F8	12.3	3400/160	8.6	0.1
2157002	3CPM-95-241212	287 x 592 x 292	F8	5.8	1700/160	6.4	0.05
2150002	3CPM-242412-60	610 x 610 x 292	F6	15.7	3400/77	8.6	0.11
2150001	3CPM-122412-60	305 x 610 x 292	F6	7.8	1700/77	6.4	0.05
2151007	3CPM-242412-90	610 x 610 x 292	F7	15.7	3400/114	8.6	0.11
2151008	3CPM-122412-90	305 x 610 x 292	F7	7.8	1700/114	6.4	0.05
2152003	3CPM-242412-95	610 x 610 x 292	F8	15.7	3400/136	8.6	0.11
2152004	3CPM-122412-95	305 x 610 x 292	F8	7.8	1700/136	6.4	0.05

Pleated Compact Filter

3HCP8 Aeropac



Advantages

- Fine fiber ensures that filter maintains its efficiency throughout its life in the system
- High dust holding capacity
- Suitable for variable airflow
- Robust design

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

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

Type: Rigid pleated filter.

Frame: Galvanised steel.

Gasket: 3HCP8 model: side gasket, at vertical side of header; 3CPMHF model: no gasket.

EN 779:2002 filter class: F6, F7, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 13, MERV 14.

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

Recommended final pressure drop: 450 Pa (suggested economical change point 250 Pa).

Temperature: Maximum continuous operating temperature of 90° C.

Fire Rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2135001	3HCP8-65-242412 AEROPAC	592 x 592 x 292	F6	10.8	3400/113	8.6	0.1
2135002	3HCP8-65-122412 AEROPAC	287 x 592 x 292	F6	5	1700/113	6.4	0.05
2136001	3HCP8-85-242412 AEROPAC	592 x 592 x 292	F7	10.8	3400/150	8.6	0.1
2136002	3HCP8-85-241212 AEROPAC	287 x 592 x 292	F7	5	1700/150	6.4	0.05
2137001	3HCP8-95-242412 AEROPAC	592 x 592 x 292	F8	10.8	3400/163	8.6	0.1
2137002	3HCP8-95-241212 AEROPAC	287 x 592 x 292	F8	5	1700/163	6.4	0.05
2130002	3CPMHF-122412-60	287 x 592 x 292	F6	5.6	1700/95	6.4	0.05
2130003	3CPMHF-242412-60	592 x 592 x 292	F6	13.1	3400/95	8.6	0.1
2131001	3CPMHF-242412-90	592 x 592 x 292	F7	13.1	3400/134	8.6	0.1
2131002	3CPMHF-122412-90	287 x 592 x 292	F7	5.6	1700/134	6.4	0.05
2132001	3CPMHF-242412-95	592 x 592 x 292	F8	13.1	3400/158	8.6	0.1
2132002	3CPMHF-122412-95	287 x 592 x 292	F8	5.6	1700/158	6.4	0.05

Summary HEPA / ULPA Filters, Class E10 to U17



Filters for High Efficiency

Microtain MDE11/MXE11/
GGE11/TRS11

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Filters for High Efficiency

Microtain MDS11/MXS11/
GGS11/TRS11

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Filters for High Efficiency

Absolute MDE13/MXE13/
GGE13/TRS13

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Filters for High Efficiency

Absolute MDS13/MXS13/
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Filters for High Efficiency

MegaFlo

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Filters for High Efficiency

Opakfil G Microtain - E10

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Filters for High Efficiency

Opakfil Absolute H13

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Filters for High Efficiency

Sofilair - E11, H13, H14

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Filters for High Efficiency

Sofilair Green
- E10, E12, H13, H14

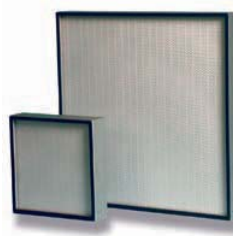
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Filters for High Efficiency

Megalam MD, MX, MG

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HEPA/ULPA Panels

Megalam MD - H13 to U15

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HEPA/ULPA Panels

Megalam MX/MG - H14 to U15

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HEPA/ULPA Panels

Megalam (Laminator)
MDL, MXL, MGL - H14 to U15

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HEPA/ULPA Panels

Silent Hood HD - H13 to U15

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HEPA/ULPA Panels

Silent Hood HL - H13 to U15

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HEPA/ULPA Panels

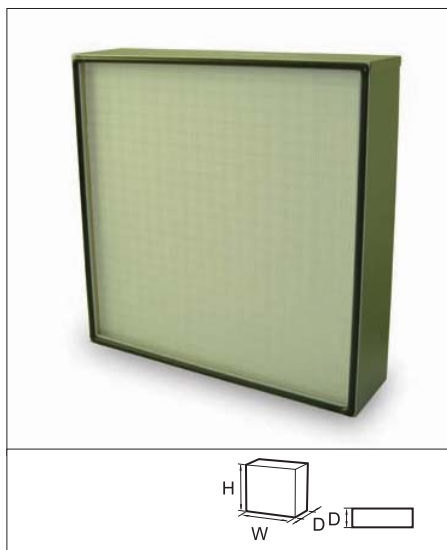
CPXRG - H13

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As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Filters for High Efficiency

Micretain MDE11/MXE11/GGE11/TRE11



Advantages

- Range of standard sizes
- Very high efficiency
- Compact design

Application: Very high efficiency final filtration, in air conditioning systems, housings-ducts or diffusers.

Type: Close pleated very high efficiency filter.

Frame: Electro Zinc.

Gasket: Endless polyurethane gasket at inlet.

Media: Pleated glass paper.

Separator: Hot melt beads.

Sealant: Polyurethane.

EN 1822:2009 filter class: E11.

MPPS efficiency: ≥ 95%.

DOP efficiency: ≥99%.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: Nominal flow rate, otherwise reduction in efficiency.

Temperature: 70°C maximum in continuous service.

Mounting systems: FCB Housings, Ducts, Diffusers, CAMSAFE.

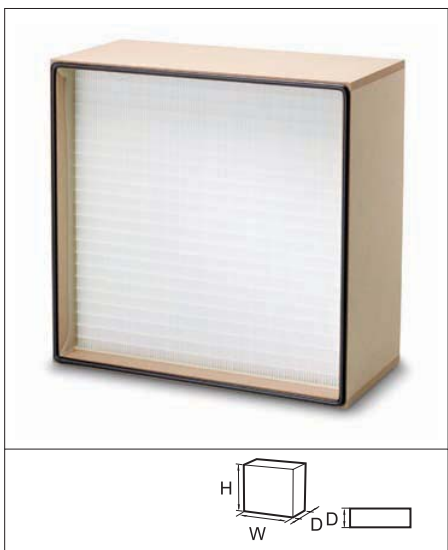
Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1400501	MDE11-1200-10/00	1219 x 610 x 150	E11	17.7	2380/125	18	0.14
1400502	MDE11-980-10/00	914 x 610 x 150	E11	13.3	1790/125	15	0.11
1400503	MDE11-830-10/00	762 x 610 x 150	E11	11.1	1490/125	13.5	0.09
1400504	MDE11-600-10/00	610 x 610 x 150	E11	8.9	1190/125	12	0.07
1400505	MDE11-500-10/00	575 x 575 x 150	E11	7.8	1055/125	11	0.07
1400506	MDE11-300-10/00	457 x 457 x 150	E11	4.9	660/125	10	0.04
1400507	MDE11-220-10/00	305 x 610 x 150	E11	4.4	590/125	6	0.04
1400508	MDE11-110-10/00	305 x 305 x 150	E11	2.2	290/125	4	0.02
1400551	MXE11-1200-10/00	1219 x 610 x 150	E11	24.8	3120/125	18	0.14
1400552	MXE11-980-10/00	914 x 610 x 150	E11	18.6	2335/125	15	0.11
1400553	MXE11-830-10/00	762 x 610 x 150	E11	15.5	1950/125	13.5	0.09
1400554	MXE11-600-10/00	610 x 610 x 150	E11	12.4	1560/125	12	0.07
1400555	MXE11-500-10/00	575 x 575 x 150	E11	11	1385/125	11	0.07
1400556	MXE11-300-10/00	457 x 457 x 150	E11	6.9	865/125	10	0.04
1400557	MXE11-220-10/00	305 x 610 x 150	E11	6.1	770/125	6	0.04
1400558	MXE11-110-10/00	305 x 305 x 150	E11	3	380/125	4	0.02
1400651	GGE11-1250-10/00	762 x 610 x 292	E11	18	2380/125	16	0.18
1400652	GGE11-1000-10/00	610 x 610 x 292	E11	14.4	1900/125	12.5	0.13
1400653	GGE11-725-10/00	457 x 610 x 292	E11	10.8	1420/125	9.9	0.13
1400654	GGE11-450-10/00	305 x 610 x 292	E11	7.2	950/125	7.2	0.07
1400701	TRE11-1250-10/00	762 x 610 x 292	E11	27	2975/125	16.2	0.18
1400702	TRE11-1000-10/00	610 x 610 x 292	E11	21.8	2380/125	13	0.13
1400703	TRE11-725-10/00	457 x 610 x 292	E11	16.4	1780/125	10	0.11
1400704	TRE11-450-10/00	305 x 610 x 292	E11	10.9	1190/125	7.2	0.07

* Other sizes are available on request.

Filters for High Efficiency

Micretain MDS11/MXS11/GGS11/TRS11



Advantages

- Range of standard sizes
- Compact design
- Very high efficiency
- Incinerable

Application: Very high efficiency final filtration.

Type: Close pleated very high efficiency filter.

Frame: Medium Density Fibre (MDF) board.

Gasket: Endless polyurethane gasket at inlet.

Media: Pleated glass paper.

Separator: Hot melt beads.

Sealant: Polyurethane.

EN 1822:2009 filter class: E11.

MPPS efficiency: $\geq 95\%$.

DOP efficiency: $\geq 99\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: Nominal flow rate, otherwise reduction in efficiency.

Temperature: 70°C maximum in continuous service.

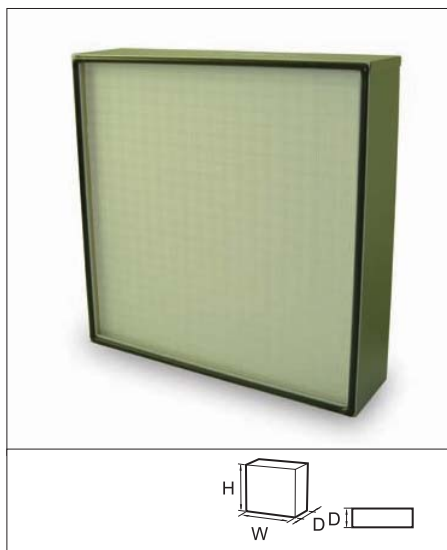
Mounting systems: FCB Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1400751	MDS11-1200-10/00	1219 x 610 x 150	E11	16.5	2220/125	18	0.14
1400752	MDS11-980-10/00	914 x 610 x 150	E11	12.3	1650/125	15	0.11
1400753	MDS11-830-10/00	762 x 610 x 150	E11	10.1	1370/125	13.5	0.09
1400754	MDS11-600-10/00	610 x 610 x 150	E11	8	1080/125	12	0.07
1400755	MDS11-500-10/00	575 x 575 x 150	E11	7.1	950/125	11	0.07
1400756	MDS11-300-10/00	457 x 457 x 150	E11	4.3	580/125	10	0.04
1400757	MDS11-220-10/00	305 x 610 x 150	E11	3.8	505/125	6	0.04
1400758	MDS11-110-10/00	305 x 305 x 150	E11	1.8	236/125	4	0.02
1400801	MXS11-1200-10/00	1219 x 610 x 150	E11	23	2900/125	18	0.14
1400802	MXS11-980-10/00	914 x 610 x 150	E11	17.1	2150/125	15	0.11
1400803	MXS11-830-10/00	762 x 610 x 150	E11	14.2	1788/125	12	0.09
1400804	MXS11-600-10/00	610 x 610 x 150	E11	11.2	1410/125	12	0.07
1400805	MXS11-500-10/00	575 x 575 x 150	E11	9.9	1245/125	11	0.07
1400806	MXS11-300-10/00	457 x 457 x 150	E11	6	760/125	10	0.04
1400807	MXS11-220-10/00	305 x 610 x 150	E11	5.3	668/125	6	0.04
1400808	MXS11-110-10/00	305 x 305 x 150	E11	2.5	310/125	4	0.02
1400901	GGs11-1250-10/00	762 x 610 x 292	E11	16.6	2180/125	16.5	0.18
1400902	GGs11-1000-10/00	610 x 610 x 292	E11	13.1	1735/125	13	0.13
1400903	GGs11-725-10/00	457 x 610 x 292	E11	9.6	1265/125	9.6	0.13
1400904	GGs11-450-10/00	305 x 610 x 292	E11	6.2	815/125	7.2	0.07
1400951	TRS11-1250-10/00	762 x 610 x 292	E11	25	2725/125	16.2	0.18
1400952	TRS11-1000-10/00	610 x 610 x 292	E11	19.8	2170/125	13	0.13
1400953	TRS11-725-10/00	457 x 610 x 292	E11	14.4	1585/125	10	0.13
1400954	TRS11-450-10/00	305 x 610 x 292	E11	9.2	1015/125	7.2	0.07

* Other sizes are available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Absolute MDE13/MXE13/GGE13/TRE13



Advantages

- Range of standard sizes
- Very high efficiency
- Compact design

Application: Very high efficiency final filtration, in air conditioning systems, housing-ducts or diffusers.

Type: Close pleated very high efficiency filter.

Frame: Electro zinc.

Gasket: Endless polyurethane gasket at inlet.

Media: Pleated glass paper.

Separator: Hot melt.

EN 1822:2009 filter class: H13.

MPPS efficiency: $\geq 99.95\%$.

DOP efficiency: $\geq 99.99\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: Nominal flow rate, otherwise reduction in efficiency.

Temperature: 70°C maximum in continuous service.

Mounting systems: FCB Housings, Ducts, Diffusers, CAMSAFE.

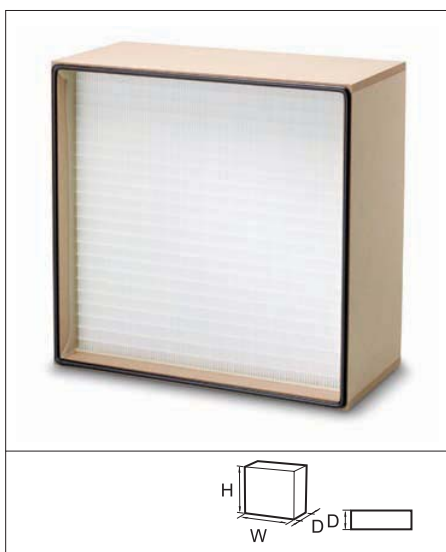
Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1400001	MDE13-1200-10/00	1219 x 610 x 150	H13	2618/250	19.7	18	0.14
1400002	MDE13-980-10/00	914 x 610 x 150	H13	1958/250	14.7	15	0.11
1400003	MDE13-830-10/00	762 x 610 x 150	H13	1635/250	12.3	13.5	0.09
1400004	MDE13-600-10/00	610 x 610 x 150	H13	1305/250	9.8	12	0.07
1400005	MDE13-500-10/00	575 x 575 x 150	H13	1161/250	8.7	11	0.07
1400006	MDE13-300-10/00	457 x 457 x 150	H13	726/250	5.5	10	0.04
1400007	MDE13-220-10/00	305 x 610 x 150	H13	645/250	4.9	6	0.04
1400008	MDE13-110-10/00	305 x 305 x 150	H13	317/250	2.4	4	0.02
1400051	MXE13-1200-10/00	1219 x 610 x 150	H13	3131/250	27.1	18	0.14
1400052	MXE13-980-10/00	914 x 610 x 150	H13	2348/250	20.1	15	0.11
1400053	MXE13-830-10/00	762 x 610 x 150	H13	1957/250	16.7	13.5	0.09
1400054	MXE13-600-10/00	610 x 610 x 150	H13	1565/250	13.4	12	0.07
1400055	MXE13-500-10/00	575 x 575 x 150	H13	1384/250	12	11	0.07
1400056	MXE13-300-10/00	457 x 457 x 150	H13	867/250	7.4	10	0.04
1400057	MXE13-220-10/00	305 x 610 x 150	H13	773/250	6.6	6	0.04
1400058	MXE13-110-10/00	305 x 305 x 150	H13	380/250	3.2	4	0.02
1400151	GGE13-1250-10/00	762 x 610 x 292	H13	2251/250	19.6	16	0.18
1400152	GGE13-1000-10/00	610 x 610 x 292	H13	1804/250	15.7	12.5	0.13
1400153	GGE13-725-10/00	457 x 610 x 292	H13	1340/250	11.7	9.9	0.13
1400154	GGE13-450-10/00	305 x 610 x 292	H13	893/250	7.8	7	0.07
1400201	TRE13-1250-10/00	762 x 610 x 292	H13	3100/250	29.4	16	0.18
1400202	TRE13-1000-10/00	610 x 610 x 292	H13	2485/250	23.5	12.5	0.13
1400203	TRE13-725-10/00	457 x 610 x 292	H13	1850/250	17.5	9.9	0.13
1400204	TRE13-450-10/00	305 x 610 x 292	H13	1230/250	11.7	7	0.07

* Other sizes are available on request.

Filters for High Efficiency

Absolute MDS13/MXS13/GGS13/TRS13



Advantages

- Range of standard sizes
- Compact design
- Very high efficiency
- Incinerable

Application: Very high efficiency final filtration, in air conditioning systems, housing-ducts or diffusers.

Type: Close pleated very high efficiency filter.

Frame: Medium Density Fibre (MDF) Board.

Gasket: Endless polyurethane gasket at inlet.

Media: Pleated glass paper.

Separator: Hot melt.

Sealant: Polyurethane.

EN 1822:2009 filter class: H13.

MPPS efficiency: $\geq 99.95\%$.

DOP efficiency: $\geq 99.99\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: Nominal flow rate, otherwise reduction in efficiency.

Temperature: 70°C maximum in continuous service.

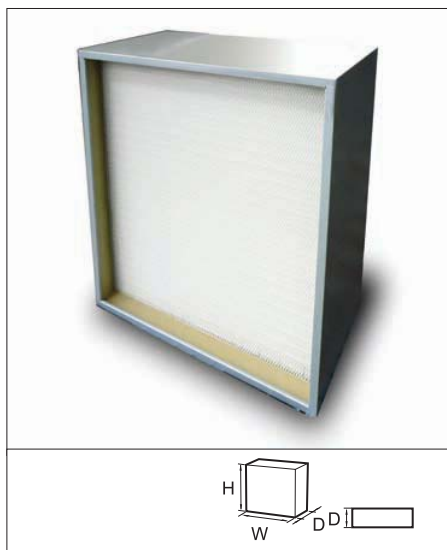
Mounting systems: FCB Housings, Ducts, Diffusers, CAMSAFE.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1400251	MDS13-1200-10/00	1219 x 610 x 150	H13	2434/250	18.3	18	0.14
1400252	MDS13-980-10/00	914 x 610 x 150	H13	1805/250	13.6	15	0.11
1400253	MDS13-830-10/00	762 x 610 x 150	H13	1497/250	11.3	13.5	0.09
1400254	MDS13-600-10/00	610 x 610 x 150	H13	1183/250	8.9	12	0.07
1400255	MDS13-500-10/00	575 x 575 x 150	H13	1046/250	7.9	11	0.07
1400256	MDS13-300-10/00	457 x 457 x 150	H13	636/250	4.8	10	0.04
1400257	MDS13-220-10/00	305 x 610 x 150	H13	553/250	4.2	6	0.04
1400258	MDS13-110-10/00	305 x 305 x 150	H13	258/250	1.9	4	0.02
1400301	MXS13-1200-10/00	1219 x 610 x 150	H13	2912/250	24.9	18	0.14
1400302	MXS13-980-10/00	914 x 610 x 150	H13	2166/250	18.5	15	0.11
1400303	MXS13-830-10/00	762 x 610 x 150	H13	1793/250	15.3	13.5	0.09
1400304	MXS13-600-10/00	610 x 610 x 150	H13	1419/250	12.1	12	0.07
1400305	MXS13-500-10/00	575 x 575 x 150	H13	1247/250	10.7	10	0.07
1400306	MXS13-300-10/00	457 x 457 x 150	H13	760/250	6.5	8	0.04
1400307	MXS13-220-10/00	305 x 610 x 150	H13	664/250	5.7	6	0.04
1400308	MXS13-110-10/00	305 x 305 x 150	H13	310/250	2.7	4	0.02
1400401	GGS13-1250-10/00	762 x 610 x 292	H13	2075/250	18.1	16	0.18
1400402	GGS13-1000-10/00	610 x 610 x 292	H13	1635/250	14.2	12.5	0.13
1400403	GGS13-725-10/00	457 x 610 x 292	H13	1210/250	10.5	9.9	0.13
1400404	GGS13-450-10/00	305 x 610 x 292	H13	770/250	6.7	7	0.07
1400451	TRS13-1250-10/00	762 x 610 x 292	H13	2855/250	27.1	16.2	0.18
1400452	TRS13-1000-10/00	610 x 610 x 292	H13	2250/250	21.3	13	0.13
1400453	TRS13-725-10/00	457 x 610 x 292	H13	1670/250	15.8	10	0.13
1400454	TRS13-450-10/00	305 x 610 x 292	H13	1060/250	10.1	7.2	0.07

* Other sizes are available on request.

Filters for High Efficiency

MegaFlo



Advantages

- High air flow applications
- High efficiency
- High quality glass fibre media
- Flexibility in size

Application: HEPA-filter for high air flows.

Type: HEPA-Filter.

Frame: Electro zinc.

Gasket: Endless polyurethane at inlet.

Media: Glass fibre.

Separators: Hot melt beads.

Sealant: Polyurethane.

Faceguard: Expanded metal on both sides powder coated with RAL 9016.

EN 1822:2009 filter class: H13, H14.

MPPS Efficiency: H13: $\geq 99.95\%$, H14: $\geq 99.995\%$.

DOP efficiency: $\geq 99.99\%$

Recommended final pressure drop: 500 Pa.

Temperature / Humidity: 70° C / 100% RH.

Fire rating: DIN 53438 Class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Airflow / pressure drop m ³ / hr / Pa	Media area m ²	Unit Weight kg	Unit Volume m ³
1408010	MegaFlo MFE13-305*610-10/22	305 x 610 x 292	H13	1500/250	19.8	13	0.075
1408011	MegaFlo MFE13-610*610-10/22	610 x 610 x 292	H13	3000/250	39.9	16	0.143
1408009	MegaFlo MFE13-762*610-10/22	762 x 610 x 292	H13	3750/250	50.1	20	0.178
1408012	MegaFlo MFE14-305*610-10/22	305 x 610 x 292	H14	1300/250	19.8	13	0.075
1408013	MegaFlo MFE14-610*610-10/22	610 x 610 x 292	H14	2600/250	39.9	16	0.143
1408014	MegaFlo MFE14-762*610-10/22	762 x 610 x 292	H14	3300/250	50.1	20	0.178

* Other sizes and frames are available on request.

Filters for High Efficiency

Opakfil G Micretain - E10



Advantages

- Easy to install
- Incinerable
- Up to 4000 m³/hr air flow
- Low weight

Application: Final filtration in air conditioning systems, industrial processes.

Type: Very high efficiency, incinerable, compact filter.

Frame: Polypropylene and ABS.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

EN 1822:2009 filter class: E10.

MPPS efficiency: > 85%.

DOP efficiency: > 95%.

Recommended final pressure drop: 450 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

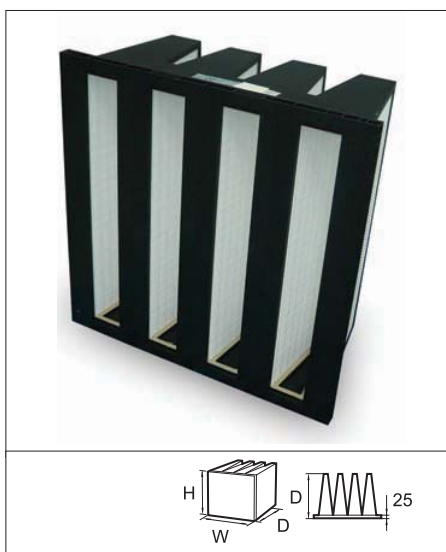
Temperature: 70°C maximum in continuous service.

Holding Frames: Front and side access housings and frames are available. Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2430001	7OPGHF-242412	592 x 592 x 290	E10	18.5	4000/250	5	0.13
2430002	7OPGHF-242012	592 x 490 x 290	E10	15.2	2850/250	4	0.13
2430003	7OPGHF-241212	592 x 287 x 290	E10	8.4	1700/250	3	0.06

* Gasket available on request.

Opakfil Absolute H13



Advantages

- Easy to install
- Low weight
- Incinerable

Application: Final filtration in air conditioning systems, industrial processes.

Type: Very high efficiency, incinerable, compact filter.

Frame: Polypropylene and ABS.

Gasket: Endless polyurethane gasket at downstream.

Media: Glass fibre paper.

Separator: Polyurethane.

EN1822:2009 filter class: H13.

MPPS efficiency: >99.95%

DOP efficiency: >99.99%.

Recommended pressure drop: 450 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Holding Frames: Front and side access housings and frames are available. Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2440001	1OPGHF-242412-01	592 x 592 x 292	H13	29.6	3000/250	5	0.13
2440002	1OPGHF-241212-01	592 x 287 x 292	H13	13.1	1350/250	3	0.06
2440003	1OPGHF-242012-01	592 x 490 x 292	H13	24.2	2450/250	4	0.13

Filters for High Efficiency

Sofilair - E11, H13, H14



Advantages

- High air flow rates, up to 5000 m³/hr
- Tested in accordance with EN 1822
- Handle to assist with filter changes
- High filter surface area offers low pressure drop for energy savings and longer life

Application: Very high efficiency final filtration in air conditioning systems, housings and diffusers.

Type: High air flow HEPA filter.

Frame: Galvanised steel.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Gasket: Endless polyurethane gasket.

EN 1822:2009 filter class: E11, H13 and H14.

MPPS efficiency: E11:>95%, H13:>99.95%, H14:> 99.995%.

DOP efficiency: ≥ 99%.

Recommended final pressure drop: 600 Pa.

Maximum air flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Mounting systems: Front and side access filter frames, FC Housings, terminal housings and safe change systems.

Fire rating: DIN 53438 class F1.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1700006	Micretain, 1570.01	610 x 610 x 292	E11	35	5000/250	23	0.11
1700007	Micretain, 1573.02	610 x 610 x 292	E11	21	4000/250	20	0.11
1700008	Micretain, 1575.02	305 x 610 x 292	E11	14	2000/250	14	0.05
1700009	Micretain, 1577.01	595 x 595 x 292	E11	38	4200/250	22	0.11
1700010	Micretain, 1578.01	289 x 595 x 292	E11	16	1700/250	13	0.05
1700001	Absolute, 1560.02	610 x 610 x 292	H13	40	4000/250	23	0.11
1700002	Absolute, 1560.01	610 x 610 x 292	H13	33	3400/250	20	0.11
1700003	Absolute, 1565.01	305 x 610 x 292	H13	16	1700/250	13	0.05
1700004	Absolute, 1567.01	595 x 595 x 292	H13	38	3200/250	22	0.11
1700005	Absolute, 1568.01	289 x 595 x 292	H13	16	1300/250	12	0.05
1700011	HEPA, 1560.02.06	610 x 610 x 292	H14	40	3000/250	23	0.11
1700013	HEPA, 1565.01.02	305 x 610 x 292	H14	16	1500/250	13	0.11
1700016	HEPA, 1560.02.99	610 x 610 x 292	H14	40	3400/250	23	0.11
1700018	HEPA, 1565.01.99	305 x 610 x 292	H14	16	1700/250	13	0.05

* Other sizes, stainless steel or aluminium frames are available on request.

Filters for High Efficiency

Sofilair Green - E10, E12, H13, H14



Advantages

- Incinerable
- High air flow rates
- New ergonomic handle to assist with filter changes
- Light weight construction
- Corrosion resistant
- High filter surface area offers low pressure drop for energy savings and longer life

Application: High efficiency final filtration in air conditioning systems, extraction from corrosive or hazardous environments.

Type: High air flow incinerable HEPA filter.

Frame: ABS.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Gasket: One piece half round continuous gasket.

EN 1822:2009 filter class: E10, E12, H13, H14.

MPPS efficiency: E10:>85%, E12:>99.5%, H13:>99.95% & H14:>99.995%.

Recommended final pressure drop: 600 Pa.

Maximum air flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 60°C maximum in continuous service.

Mounting systems: Front and side access filter frames. Terminal housings and safe change systems.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1575.82.00	SFRG-P-2000-E10	305 x 610 x 292	E10	13	2000/230	6	0.06
1570.81.00	SFRG-P-5000-E10	610 x 610 x 292	E10	33	5000/230	12	0.11
1585.81.00	SFRG-P-1500-E12	305 x 610 x 292	E12	15	1500/250	10	0.06
1580.82.00	SFRG-P-4000-E12	610 x 610 x 292	E12	38	4000/250	13.5	0.11
1565.81.00	SFRG-P-1500-H13	305 x 610 x 292	H13	15	1500/250	6	0.06
1560.82.00	SFRG-P-4000-H13	610 x 610 x 292	H13	38	4000/250	12	0.11
1565.81.02	SFRG-P-1400-H14	305 x 610 x 292	H14	15	1400/280	6	0.06
1560.82.06	SFRG-P-3500-H14	610 x 610 x 292	H14	38	3500/270	12	0.11

Megalam MD, MX, MG

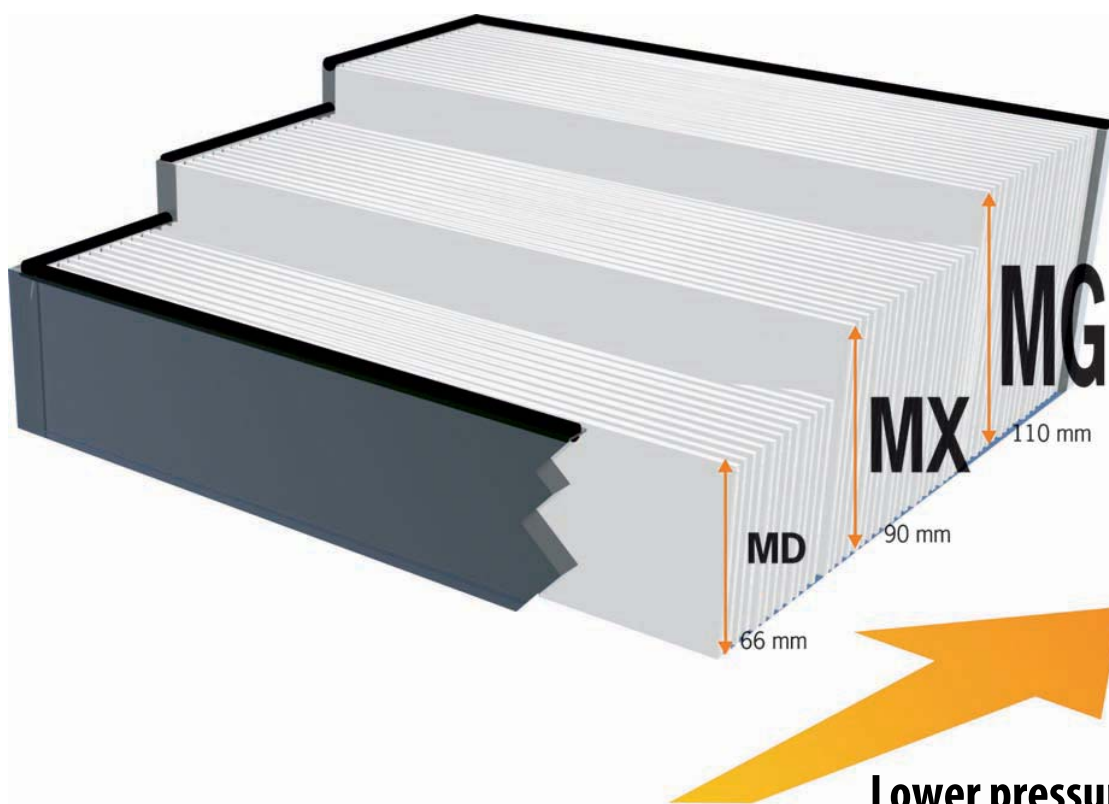


Advantages

- Low pressure drop
- Low noise
- Higher flow rate
- Longer operating life

Example: Megalam H14 / 610x610 mm

	MD	MX	MG
Filter area	10m ²	12.5m ²	18m ²
Pressure drop at 0.45 m/s	140 Pa	95 Pa (-32%)	65 Pa (-54%)
Maximum airflow	900 m ³ /h	1300 m ³ /h	2000 m ³ /h
Energy		-32%	-54%
Lifespan	(-)	x 1.5	x 2.5



Lower pressure drop
Higher airflow rate
More energy savings
Longer operating life

Megalam Configurations Options

We have included a range of standard configurations in this catalogue, but the Megalam series of clean room panels can be configured with a wide range of options to meet your requirement. Options include (first item denotes the standard product):

Element	Options
Gasket	<ul style="list-style-type: none"> - Endless Polyurethane - Poron - Neoprene - PU Gel - Silicone Gel - None
Faceguard	<ul style="list-style-type: none"> - RAL 9016 powder coated hot dip galvanized iron - Custom color powder coated hot dip galvanized iron - Stainless steel - Anodized aluminium - None
Frame Type	<ul style="list-style-type: none"> - Anodized aluminium - Anodized aluminium knife type
High Performance Airflow Distribution	<ul style="list-style-type: none"> - Glass fibre screen - Synthetic screen
Filter Efficiency	<ul style="list-style-type: none"> - H10 - U17 according to EN1822 - Rating at 0.3 µm or 0.12 µm
Test Aerosol	<ul style="list-style-type: none"> - DEHS (liquid) - PSL (solid) - None
Fire Rating	<ul style="list-style-type: none"> - DIN 53438 - UL 900 - FM 4920
Media Options	<ul style="list-style-type: none"> - Glass fibre media - Low boron media - ePFTE media

HEPA / ULPA Panels

Profiles for Megalam Filter



Extruded aluminium frames for megalam filters

This overview shows the different standard frame profiles available.

Frame

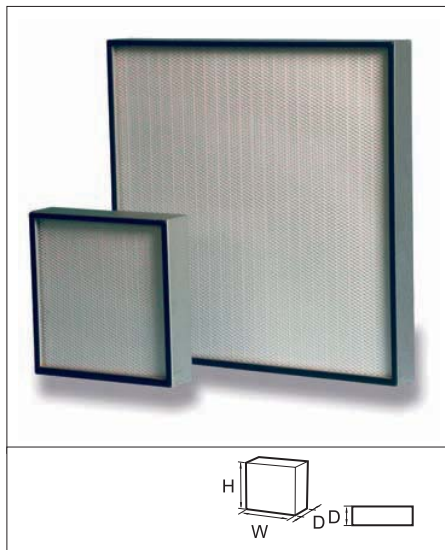
Seal	Filter Type		
	MD	MX	MG
GASKET			
LIQUID SEAL			
LIQUID SEAL			
KNIFE EDGE			

* Other profile configurations are available upon request

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

HEPA/ULPA Panels

Megalam MD - H13 to U15



Advantages

- Low pressure drop
- Double faceguard
- Individually tested according to EN 1822
- Guaranteed performance
- Laminarity better than +/- 20%

Application: Final or return filtration for clean rooms with turbulent flow.

Type: High efficiency filter panel with seal for mechanical clamping mounting systems.

Frame: Extruded and anodized aluminium.

Gasket: Endless polyurethane at inlet.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Faceguard: Expanded metal on both sides, powder coated with RAL 9016.

EN 1822:2009 filter class: H13, H14, U15.

MPPS efficiency: H13: $\geq 99.95\%$, H14: $\geq 99.995\%$, U15: $\geq 99.9995\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Test: 100% individually tested according to EN 1822.

Mounting system: Mechanical clamping structure, Terminal housings.

Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15002001	MD13-305*305-10/22	305 x 305 x 66	H13	2.4	151/119	1	0.01
15002002	MD13-305*610-10/22	305 x 610 x 66	H13	4.8	301/116	2	0.02
15002003	MD13-610*610-10/22	610 x 610 x 66	H13	9.7	603/115	4	0.03
15002004	MD13-762*610-10/22	762 x 610 x 66	H13	12.2	753/115	5	0.04
15002005	MD13-914*610-10/22	914 x 610 x 66	H13	14.6	903/114	6	0.05
15002006	MD13-1219*610-10/22	1219 x 610 x 66	H13	19.5	1205/114	8	0.07
15002007	MD13-1524*610-10/22	1524 x 610 x 66	H13	24.5	1506/114	10	0.09
15002008	MD13-914*762-10/22	914 x 762 x 66	H13	18.4	1128/114	7.5	0.07
15002009	MD13-1219*762-10/22	1219 x 762 x 66	H13	24.5	1505/114	10	0.09
15002010	MD13-1524*762-10/22	1524 x 762 x 66	H13	30.7	1881/114	12.5	0.11
15002011	MD13-914*914-10/22	914 x 914 x 66	H13	22.1	1353/113	9	0.08
15002201	MD14-305*305-10/22	305 x 305 x 66	H14	2.4	151/145	1	0.01
15002202	MD14-305*610-10/22	305 x 610 x 66	H14	4.8	301/142	2	0.02
15002203	MD14-610*610-10/22	610 x 610 x 66	H14	9.7	603/141	4	0.03
15002204	MD14-762*610-10/22	762 x 610 x 66	H14	12.2	753/140	5	0.04
15002205	MD14-914*610-10/22	914 x 610 x 66	H14	14.6	903/140	6	0.05
15002206	MD14-1219*610-10/22	1219 x 610 x 66	H14	19.5	1205/140	8	0.07
15002207	MD14-1524*610-10/22	1524 x 610 x 66	H14	24.5	1506/140	10	0.09
15002208	MD14-914*762-10/22	914 x 762 x 66	H14	18.4	1128/139	7.5	0.07
15002209	MD14-1219*762-10/22	1219 x 762 x 66	H14	24.5	1505/139	10	0.09
15002210	MD14-1524*762-10/22	1524 x 762 x 66	H14	30.7	1881/139	12.5	0.17
15002211	MD14-914*914-10/22	914 x 914 x 66	H14	22.1	1353/139	9	0.08
15002401	MD15-305*305-10/22	305 x 305 x 66	U15	2.7	151/150	1	0.01
15002402	MD15-305*610-10/22	305 x 610 x 66	U15	5.6	301/146	2	0.02
15002403	MD15-610*610-10/22	610 x 610 x 66	U15	11.3	603/146	4	0.03
15002404	MD15-762*610-10/22	762 x 610 x 66	U15	14.2	753/145	5	0.04
15002405	MD15-914*610-10/22	914 x 610 x 66	U15	17.1	903/145	6	0.05
15002406	MD15-1219*610-10/22	1219 x 610 x 66	U15	22.7	1205/145	8	0.07
15002407	MD15-1524*610-10/22	1524 x 610 x 66	U15	28.5	1506/144	10	0.09
15002408	MD15-914*762-10/22	914 x 762 x 66	U15	21.4	1128/144	7.5	0.07
15002409	MD15-1219*762-10/22	1219 x 762 x 66	U15	28.5	1505/144	10	0.09
15002410	MD15-1524*762-10/22	1524 x 762 x 66	U15	35.7	1881/144	12.5	0.11
15002411	MD15-914*914-10/22	914 x 914 x 66	U15	26	1353/143	9	0.08

* Other sizes are available on request.

HEPA/ULPA Panels

Megalam MX - H14 to U15



Advantages

- Low pressure drop
- Higher flow rate
- Individually tested according to EN 1822
- Longer operating life
- Laminarity better than +/- 20%

Application: Final or return filtration for clean rooms with turbulent flow.

Type: High efficiency filter panel with seal for mechanical clamping systems.

Frame: Extruded and anodised aluminium.

Gasket: Polyurethane endless at inlet.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Faceguard: Expanded metal on both side, powder coated RAL 9016.

EN 1822:2009 filter class: H14, U15.

MPPS efficiency: H14: $\geq 99.995\%$, U15: $\geq 99.9995\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: see table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Test: 100% individually tested according to EN 1822.

Mounting system: Mechanical clamping structure, Terminal housing.

Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15002801	MX14-305*305-10/22	305 x 305 x 90	H14	3.2	151/99	1.4	0.01
15002802	MX14-305*610-10/22	305 x 610 x 90	H14	6.6	301/96	2.8	0.02
15002803	MX14-610*610-10/22	610 x 610 x 90	H14	13.2	603/96	5.6	0.04
15002804	MX14-762*610-10/22	762 x 610 x 90	H14	16.5	753/95	7	0.05
15002805	MX14-914*610-10/22	914 x 610 x 90	H14	20.2	903/95	8.4	0.07
15002806	MX14-1219*610-10/22	1219 x 610 x 90	H14	27	1205/95	11.2	0.09
15002807	MX14-1524*610-10/22	1524 x 610 x 90	H14	33.2	1506/95	14	0.12
15002808	MX14-914*762-10/22	914 x 762 x 90	H14	25.2	1128/95	10.5	0.09
15002809	MX14-1219*762-10/22	1219 x 762 x 90	H14	33.4	1505/95	14	0.12
15002810	MX14-1524*762-10/22	1524 x 762 x 90	H14	42.2	1881/95	17.5	0.14
15002811	MX14-914*914-10/22	914 x 914 x 90	H14	30	1353/95	12.6	0.1
15003001	MX15-305*305-10/22	305 x 305 x 90	U15	3.7	151/119	1.4	0.01
15003002	MX15-305*610-10/22	305 x 610 x 90	U15	7.5	301/116	2.8	0.02
15003003	MX15-610*610-10/22	610 x 610 x 90	U15	15.2	603/115	5.6	0.04
15003004	MX15-762*610-10/22	762 x 610 x 90	U15	19	753/115	7	0.06
15003005	MX15-914*610-10/22	914 x 610 x 90	U15	23.1	903/115	8.4	0.07
15003006	MX15-1219*610-10/22	1219 x 610 x 90	U15	30.5	1205/115	11.2	0.09
15003007	MX15-1524*610-10/22	1524 x 610 x 90	U15	38.1	1506/115	14	0.12
15003008	MX15-914*762-10/22	914 x 762 x 90	U15	28.6	1128/115	10.5	0.09
15003009	MX15-1219*762-10/22	1219 x 762 x 90	U15	38.2	1505/114	14	0.12
15003010	MX15-1524*762-10/22	1524 x 762 x 90	U15	48.4	1881/114	17.5	0.14
15003011	MX15-914*914-10/22	914 x 914 x 90	U15	34.4	1353/114	12.6	0.1

* Other sizes are available on request.

HEPA/ULPA Panels

Megalam MG - H14 to U15



Advantages

- Low pressure drop
- Double faceguard
- Individually tested according to EN 1822
- Longer operating life
- Laminarity better than +/- 20%

Application: Final or return filtration for clean rooms with turbulent flow.

Type: High efficiency filter panel with seal for mechanical clamping mounting systems.

Frame: Extruded and anodized aluminium.

Gasket: Endless polyurethane at inlet.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Faceguard: Expanded metal on both sides, powder coated with RAL 9016.

EN 1822:2009 filter class: H14, U15.

MPPS efficiency: H14: $\geq 99.995\%$, U15: $\geq 99.9995\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Test: 100% individually tested according to EN 1822.

Mounting system: Mechanical clamping structure, Terminal housings.

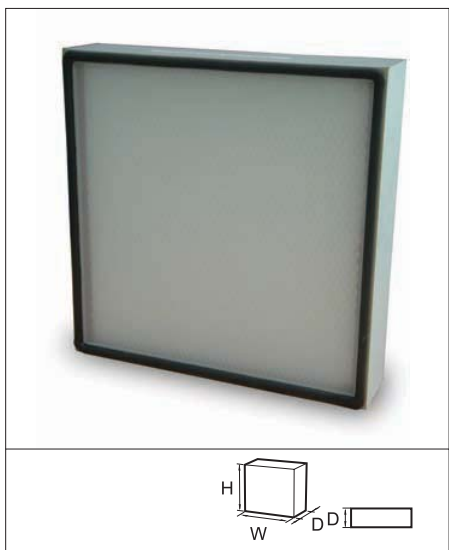
Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15003401	MG14-305*305-10/22	305 x 305 x 110	H14	4.2	151/66	1.7	0.02
15003402	MG14-305*610-10/22	305 x 610 x 110	H14	8.7	301/65	2.9	0.03
15003403	MG14-610*610-10/22	610 x 610 x 110	H14	17.5	603/65	5.3	0.06
15003404	MG14-762*610-10/22	762 x 610 x 110	H14	22.2	753/64	6.5	0.07
15003405	MG14-914*610-10/22	914 x 610 x 110	H14	26.3	903/64	7.7	0.09
15003406	MG14-1219*610-10/22	1219 x 610 x 110	H14	35.2	1205/64	10	0.14
15003407	MG14-1524*610-10/22	1524 x 610 x 110	H14	44	1506/64	12.4	0.14
15003408	MG14-914*762-10/22	914 x 762 x 110	H14	33.4	1128/64	9.4	0.11
15003409	MG14-1219*762-10/22	1219 x 762 x 110	H14	44.2	1505/64	12.4	0.14
15003410	MG14-1524*762-10/22	1524 x 762 x 110	H14	55.2	1881/64	15.4	0.14
15003411	MG14-914*914-10/22	914 x 914 x 110	H14	40.1	1353/64	11.2	0.13
15003601	MG15-305*305-10/22	305 x 305 x 110	U15	4.6	151/83	1.7	0.02
15003602	MG15-305*610-10/22	305 x 610 x 110	U15	9.3	301/81	2.9	0.03
15003603	MG15-610*610-10/22	610 x 610 x 110	U15	19	603/81	5.3	0.06
15003604	MG15-762*610-10/22	762 x 610 x 110	U15	23.5	753/80	6.5	0.07
15003605	MG15-914*610-10/22	914 x 610 x 110	U15	28.2	903/80	7.7	0.09
15003606	MG15-1219*610-10/22	1219 x 610 x 110	U15	38.4	1205/80	10	0.11
15003607	MG15-1524*610-10/22	1524 x 610 x 110	U15	48	1506/80	12.4	0.14
15003608	MG15-914*762-10/22	914 x 762 x 110	U15	35.4	1128/80	9.4	0.11
15003609	MG15-1219*762-10/22	1219 x 762 x 110	U15	48	1505/80	12.4	0.14
15003610	MG15-1524*762-10/22	1524 x 762 x 110	U15	60	1881/80	15.4	0.14
15003611	MG15-914*914-10/22	914 x 914 x 110	U15	43	1353/80	11.2	0.13

* Other sizes are available on request.

HEPA/ULPA Panels

Megalam (Laminator) MDL, MXL, MGL - H14 to U15



Advantages

- Low pressure drop
- Single faceguard
- Individually tested according to EN 1822
- Longer operating life
- Laminarity better than +/- 10%

Application: Final or return filtration for clean rooms with turbulent flow.

Type: High efficiency filter panel with laminator and seal for mechanical clamping systems.

Frame: Extruded and anodized aluminium.

Gasket: Polyurethane endless at outlet.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Laminator: Glass fibre screen, bonded downstream for laminar diffusion.

Faceguard: Expanded metal at inlet side, powder coated RAL 9016.

EN 1822:2009 filter class: H14, U15.

MPPS efficiency: H14: $\geq 99.995\%$, U15: $\geq 99.9995\%$.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Mounting system: Mechanical clamping structure, Terminal housing.

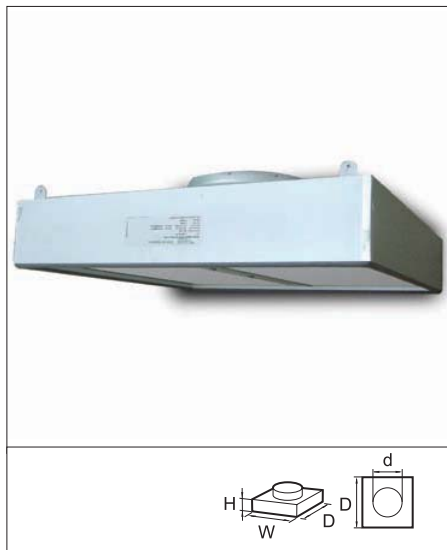
Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15000203	MDL14-610*610-01/20	610 x 610 x 66	H14	9.7	603/156	4	0.03
15000206	MDL14-1219*610-01/20	1219 x 610 x 66	H14	19.5	1205/155	8	0.07
15000403	MDL15-610*610-01/20	610 x 610 x 66	U15	11.3	603/161	4	0.03
15000406	MDL15-1219*610-01/20	1219 x 610 x 66	U15	23.1	1205/160	8	0.07
15000803	MXL14-610*610-01/20	610 x 610 x 90	H14	13.2	603/110	5.6	0.03
15000806	MXL14-1219*610-01/20	1219 x 610 x 90	H14	26.6	1205/110	11.2	0.07
15001003	MXL15-610*610-01/20	610 x 610 x 90	U15	15.2	603/131	5.6	0.03
15001006	MXL15-1219*610-01/20	1219 x 610 x 90	U15	30.5	1205/130	11.2	0.07
15001403	MGL14-610*610-01/20	610 x 610 x 110	H14	17.5	603/75	5.3	0.04
15001406	MGL14-1219*610-01/20	1219 x 610 x 110	H14	35.2	1205/74	10	0.08
15001603	MGL15-610*610-01/20	610 x 610 x 110	U15	18.8	603/95	5.3	0.04
15001606	MGL15-1219*610-01/20	1219 x 610 x 110	U15	37.8	1205/94	10	0.08

* Other sizes are available on request.

HEPA/ULPA Panels

Silent Hood HD - H13 to U15



Advantages

- Compact filter-diffuser for clean room
- Ready to install
- Low noise
- Test port
- Non-slip collar design
- Laminarity +/- 20%
- Roomside adjustable diffuser disc

Application: Final filtration for clean rooms.

Type: Ready to install HEPA/ULPA filter diffuser.

Frame: Extruded and anodised aluminium, galvanised steel cover.

Gasket: Endless PU.

Media: Glass fibre paper.

Separator: Hot melt beads.

Sealant: Polyurethane.

Terminal: Collar with outer dia. 305 mm (12in) or 210 mm (10in) depending on the model.

Diffuser disc: Perforated aluminium.

Faceguard: Expanded metal on outlet, powder coated RAL 9016.

EN 1822:2009 filter class: H13, H14, U15.

MPPS efficiency: H13: ≥99.95%, H14: ≥99.995% U15: ≥99.9995%.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Test: 100% individually scanned in accordance with EN 1822.

Mounting system: Integrated suspension eyes.

Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15300001	MD13-HD10-610*610-01/02	610 x 610 x 110	H13	9.7	603/130	13	0.07
15300002	MD13-HD10-914*610-01/02	914 x 610 x 110	H13	14.6	903/129	16	0.11
15300003	MD13-HD10-1219*610-01/02	1219 x 610 x 110	H13	19.5	1205/129	19	0.15
15300004	MD13-HD10-600*600-01/02	600 x 600 x 110	H13	9.4	583/130	13	0.07
15300005	MD13-HD10-905*600-01/02	905 x 600 x 110	H13	14.2	880/130	16	0.11
15300006	MD13-HD10-1210*600-01/02	1210 x 600 x 110	H13	19.1	1176/129	19	0.15
15300101	MD14-HD10-610*610-01/02	610 x 610 x 110	H14	9.7	603/156	13	0.07
15300102	MD14-HD10-914*610-01/02	914 x 610 x 110	H14	14.6	903/155	16	0.11
15300103	MD14-HD10-1219*610-01/02	1219 x 610 x 110	H14	19.5	1205/155	19	0.15
15300104	MD14-HD10-600*600-01/02	600 x 600 x 110	H14	9.4	583/156	13	0.07
15300105	MD14-HD10-905*600-01/02	905 x 600 x 110	H14	14.2	880/155	16	0.11
15300106	MD14-HD10-1210*600-01/02	1210 x 600 x 110	H14	19.1	1176/155	19	0.15
15300201	MD15-HD10-610*610-01/02	610 x 610 x 110	U15	11.3	603/161	13	0.07
15300202	MD15-HD10-914*610-01/02	914 x 610 x 110	U15	17.1	903/160	16	0.11
15300203	MD15-HD10-1219*610-01/02	1219 x 610 x 110	U15	22.7	1205/160	19	0.15
15300204	MD15-HD10-600*600-01/02	600 x 600 x 110	U15	11	583/160	13	0.07
15300205	MD15-HD10-905*600-01/02	905 x 600 x 110	U15	16.6	880/160	16	0.11
15300206	MD15-HD10-1210*600-01/02	1210 x 600 x 110	U15	22.2	1176/160	19	0.15
15300401	MX14-HD10-610*610-01/02	610 x 610 x 133	H14	13.2	603/111	15	0.09
15300402	MX14-HD10-914*610-01/02	914 x 610 x 133	H14	19.9	903/110	19	0.13
15300403	MX14-HD10-1219*610-01/02	1219 x 610 x 133	H14	26.6	1205/110	22	0.18
15300404	MX14-HD10-600*600-01/02	600 x 600 x 133	H14	12.8	583/110	15	0.09

* Other sizes are available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

HEPA/ULPA Panels

Silent Hood HD - H13 to U15

Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

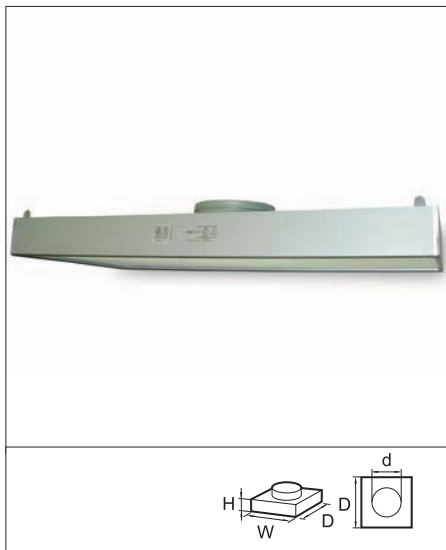
Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15300405	MX14-HD10-905*600-01/02	905 x 600 x 133	H14	19.4	880/110	19	0.13
15300406	MX14-HD10-1210*600-01/02	1210 x 600 x 133	H14	25.9	1176/110	22	0.18
15300501	MX15-HD10-610*610-01/02	610 x 610 x 133	U15	15.2	603/130	15	0.09
15300502	MX15-HD10-914*610-01/02	914 x 610 x 133	U15	22.8	903/130	19	0.13
15300503	MX15-HD10-1219*610-01/02	1219 x 610 x 133	U15	30.5	1205/130	22	0.18
15300504	MX15-HD10-600*600-01/02	600 x 600 x 133	U15	14.7	583/130	15	0.09
15300505	MX15-HD10-905*600-01/02	905 x 600 x 133	U15	22.2	880/130	19	0.13
15300506	MX15-HD10-1210*600-01/02	1210 x 600 x 133	U15	29.7	1176/130	22	0.18
15300701	MG14-HD10-610*610-01/02	610 x 610 x 155	H14	17.1	603/81	18	0.1
15300703	MG14-HD10-1219*610-01/02	1219 x 610 x 155	H14	34.7	1205/80	26	0.21
15300801	MG15-HD10-610*610-01/02	610 x 610 x 155	U15	18.3	603/100	18	0.1
15300803	MG15-HD10-1219*610-01/02	1219 x 610 x 155	U15	37.3	1205/98	26	0.21
15301001	MD13-HD12- 610*610-01/02	610 x 610 x 110	H13	9.7	603/130	13	0.07
15301002	MD13-HD12- 914*610-01/02	914 x 610 x 110	H13	14.6	903/129	16	0.11
15301003	MD13-HD12-1219* 610-01/02	1219 x 610 x 110	H13	19.5	1205/129	19	0.15
15301004	MD13-HD12- 600*600-01/02	600 x 600 x 110	H13	9.4	583/130	13	0.07
15301005	MD13-HD12- 905*600-01/02	905 x 600 x 110	H13	14.2	880/130	16	0.11
15301006	MD13-HD12-1210* 600-01/02	1210 x 600 x 110	H13	19.1	1176/129	19	0.15
15301101	MD14-HD12- 610*610-01/02	610 x 610 x 110	H14	9.7	603/156	13	0.07
15301102	MD14-HD12- 914*610-01/02	914 x 610 x 110	H14	14.6	903/155	16	0.11
15301103	MD14-HD12-1219*610-01/02	1219 x 610 x 110	H14	19.5	1205/155	19	0.15
15301104	MD14-HD12- 600*600-01/02	600 x 600 x 110	H14	9.4	583/156	13	0.07
15301105	MD14-HD12 905*600-01/02	905 x 600 x 110	H14	14.2	880/155	16	0.11
15301106	MD14-HD12-1210*600-01/02	1210 x 600 x 110	H14	19.1	1176/155	19	0.15
15301201	MD15-HD12-610*610-01/02	610 x 610 x 110	U15	11.3	603/161	13	0.07
15301202	MD15-HD12-610*610-01/02	914 x 610 x 110	U15	17.1	903/160	16	0.11
15301203	MD15-HD12-1219*610-01/02	1219 x 610 x 110	U15	22.7	1205/160	19	0.15
15301204	MD15-HD12-600*600-01/02	600 x 600 x 110	U15	11	583/160	13	0.07
15301205	MD15-HD12-905*600-01/02	905 x 600 x 110	U15	16.6	880/160	16	0.11
15301206	MD15-HD12-1210*600-01/02	1210 x 600 x 110	U15	22.2	1176/160	19	0.15
15301401	MX14-HD12 610*610-01/02	610 x 610 x 133	H14	13.2	603/111	15	0.09
15301402	MX14-HD12 914*610-01/02	914 x 610 x 133	H14	19.9	903/110	19	0.13
15301403	MX14-HD12-1219*610-01/02	1219 x 610 x 133	H14	26.6	1205/110	22	0.18
15301404	MX14-HD12 600*600-01/02	600 x 600 x 133	H14	12.8	583/110	15	0.09
15301405	MX14-HD14 905*600-01/02	905 x 600 x 133	H14	19.4	880/110	19	0.13
15301406	MX14-HD12-1210*600-01/02	1210 x 600 x 133	H14	25.9	1176/110	22	0.18
15301501	MX15-HD12-610*610-01/02	610 x 610 x 133	U15	15.2	603/130	15	0.09
15301502	MX15-HD12-914*610-01/02	914 x 610 x 133	U15	22.8	903/130	19	0.13
15301503	MX15-HD12-1219*610-01/02	1219 x 610 x 133	U15	30.5	1205/130	22	0.18
15301504	MX15-HD12-600*600-01/02	600 x 600 x 133	U15	14.7	583/130	15	0.09
15301505	MX15-HD12-905*600-01/02	905 x 600 x 133	U15	22.2	880/130	19	0.13
15301506	MX15-HD12-1210*600-01/02	1210 x 600 x 133	U15	29.7	1176/130	22	0.18
15301701	MG14-HD12-610*610-01/02	610 x 610 x 155	H14	17.1	603/81	18	0.1
15301703	MG14-HD12-1219*610-01/02	1219 x 610 x 155	H14	34.7	1205/80	26	0.21
15301801	MG15-HD12-610*610-01/02	610 x 610 x 155	U15	18.3	603/100	18	0.1
15301803	MG15-HD12-1219*610-01/02	1219 x 610 x 155	U15	37.3	1205/98	26	0.21

* Other sizes are available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

HEPA/ULPA Panels

Silent Hood HL - H13 to U15



Advantages

- Compact filter-diffuser for clean room
- Quiet: LW = 35 dB
- Ready to install
- Laminarity +/- 20%

Application: Final filtration for clean rooms.

Type: Ready to install HEPA/ULPA filter diffuser.

Frame: Extruded and anodised aluminium, galvanised steel cover.

Gasket: Endless PU.

Media: Glass fibre paper.

Separator: Hot melt beads.

Sealant: Polyurethane.

Terminal: Collar with outer dia. 305 mm (12in) or 210 mm (10in) depending on the model.

Faceguard: Expanded metal powder coated RAL 9016.

EN 1822:2009 filter class: H13, H14, U15.

MPPS efficiency: H13: ≥99.95%, H14: ≥99.995%, U15: ≥99.9995%.

Recommended final pressure drop: 500 Pa.

Maximum flow rate: See table, use nominal values otherwise a reduction in efficiency may occur.

Temperature: 70°C maximum in continuous service.

Test: 100% individually scanned in accordance with EN 1822.

Mounting system: Integrated suspension eyes.

Fire rating: UL 900, FM 4920 approval on request.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15401001	MD13-HL10-610*610-01/02	610 x 610 x 110	H13	9.9	603/130	13	0.09
15401002	MD13-HL10-914*610-01/02	914 x 610 x 110	H13	14.9	903/129	16	0.18
15401003	MD13-HL10-1219*610-01/02	1219 x 610 x 110	H13	19.9	1205/129	19	0.18
15401004	MD13-HL10-600*600-01/02	600 x 600 x 110	H13	9.6	583/130	13	0.09
15401005	MD13-HL10-905*600-01/02	905 x 600 x 110	H13	14.5	880/130	16	0.18
15401006	MD13-HL10-1210*600-01/02	1210 x 600 x 110	H13	19.4	1176/129	19	0.18
15401101	MD14-HL10-610*610-01/02	610 x 610 x 110	H14	9.9	603/156	13	0.09
15401102	MD14-HL10 914*610-01/02	914 x 610 x 110	H14	14.9	903/155	16	0.18
15401103	MD14-HL10-1219*610-01/02	1219 x 610 x 110	H14	19.9	1205/155	19	0.18
15401104	MD14-HL10 600*600-01/02	600 x 600 x 110	H14	9.6	583/156	13	0.09
15401105	MD14-HL10 905*600-01/02	905 x 600 x 110	H14	14.5	880/155	16	0.18
15401106	MD14-HL10-1210*600-01/02	1210 x 600 x 110	H14	19.4	1176/155	19	0.18
15401201	MD15-HL10-610*610-01/02	610 x 610 x 110	U15	11.5	603/161	13	0.09
15401202	MD15-HL10-914*610-01/02	914 x 610 x 110	U15	17.3	903/160	16	0.18
15401203	MD15-HL10-1219*610-01/02	1219 x 610 x 110	U15	23.1	1205/160	19	0.18
15401204	MD15-HL10-600*600-01/02	600 x 600 x 110	U15	11.2	583/160	13	0.09
15401205	MD15-HL10-905*600-01/02	905 x 600 x 110	U15	16.9	880/160	16	0.18
15401206	MD15-HL10-1210*600-01/02	1210 x 600 x 110	U15	22.6	1176/160	19	0.18
15401401	MX14-HL10 610*610-01/02	610 x 610 x 133	H14	13.4	603/111	13	0.09
15401402	MX14 HL10 914*610-01/02	914 x 610 x 133	H14	20.2	903/110	16	0.18
15401403	MX14-HL10-1219*610-01/02	1219 x 610 x 133	H14	24.0	1205/110	19	0.18
15401404	MX14-HL10 600*600-01/02	600 x 600 x 133	H14	13.1	583/110	13	0.09
15401405	MX14-HL10 905*600-01/02	905 x 600 x 133	H14	19.7	880/110	16	0.18
15401406	MX14-HL10-1210*600-01/02	1210 x 600 x 133	H14	26.3	1176/110	19	0.18
15401501	MX15- HL10-610*610-01/02	610 x 610 x 133	U15	15.4	603/130	13	0.09

* Other sizes are available on request.

HEPA/ULPA Panels

Silent Hood HL - H13 to U15

Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15401502	MX15- HL10-914*610-01/02	914 x 610 x 133	U15	23.2	903/130	16	0.18
15401503	MX15- HL10-1219*610-01/02	1219 x 610 x 133	U15	31.0	1205/130	19	0.18
15401504	MX15- HL10-600*600-01/02	600 x 600 x 133	U15	14.9	583/130	13	0.09
15401505	MX15 -HL10-905*600-01/02	905 x 600 x 133	U15	22.5	880/130	16	0.18
15401506	MX15- HL10-1210*600-01/02	1210 x 600 x 133	U15	30.2	1176/130	19	0.18
15403001	MD13-HL12-610*610-01/02	610 x 610 x 110	H13	9.9	603/130	13	0.09
15403002	MD13-HL12-914*610-01/02	914 x 610 x 110	H13	14.9	903/129	16	0.18
15403003	MD13-HL12-1219*610-01/02	1219 x 610 x 110	H13	19.9	1205/129	19	0.18
15403004	MD13-HL12-600*600-01/02	600 x 600 x 110	H13	9.6	583/130	13	0.09
15403005	MD13-HL12-905*600-01/02	905 x 600 x 110	H13	14.5	880/130	16	0.18
15403006	MD13-HL12-1210*600-01/02	1210 x 600 x 110	H13	19.4	1176/129	19	0.18
15403101	MD14-HL12 610*610-01/02	610 x 610 x 110	H14	9.9	603/156	13	0.09
15403102	MD14-HL12 914*610-01/02	914 x 610 x 110	H14	14.9	903/155	16	0.18
15403103	MD14-HL12-1219*610-01/02	1219 x 610 x 110	H14	19.9	1205/155	19	0.18
15403104	MD14-HL12 600*600-01/02	600 x 600 x 110	H14	9.6	583/156	13	0.09
15403105	MD14-HL12 905*600-01/02	905 x 600 x 110	H14	14.5	880/155	16	0.18
15403106	MD14-HL12-1210*600-01/02	1210 x 600 x 110	H14	19.4	1176/155	19	0.18
15403201	MD15-HL12-610*610-01/02	610 x 610 x 110	U15	11.5	603/161	13	0.09
15403202	MD15-HL12-914*610-01/02	914 x 610 x 110	U15	17.3	903/160	16	0.18
15403203	MD15-HL12-1219*610-01/02	1219 x 610 x 110	U15	23.1	1205/160	19	0.18
15403204	MD15-HL12-600*600-01/02	600 x 600 x 110	U15	11.2	583/160	13	0.09
15403205	MD15-HL12-905*600-01/02	905 x 600 x 110	U15	16.9	880/160	16	0.18
15403206	MD15-HL12-1210*600-01/02	1210 x 600 x 110	U15	22.6	1176/160	19	0.18
15403401	MX14-HL12 610*610-01/02	610 x 610 x 133	H14	13.4	603/111	13	0.09
15403402	MX14-HL12 914*610-01/02	914 x 610 x 133	H14	20.2	903/110	16	0.18
15403403	MX14-HL12-1219*610-01/02	1219 x 610 x 133	H14	27	1205/110	19	0.18
15403404	MX14-HL12 600*600-01/02	600 x 600 x 133	H14	13.1	583/110	13	0.09
15403405	MX14-HL12 905*600-01/02	905 x 600 x 133	H14	19.7	880/110	16	0.18
15403406	MX14-HL12-1210*600-01/02	1210 x 600 x 133	H14	26.3	1176/110	19	0.18
15403501	MX15-HL12-610*610-01/02	610 x 610 x 133	U15	15.4	603/130	13	0.09
15403502	MX15-HL12-914*610-01/02	914 x 610 x 133	U15	23.2	903/130	16	0.18
15403503	MX15-HL12-1219*610-01/02	1219 x 610 x 133	U15	31	1205/130	19	0.18
15403504	MX15-HL12-600*600-01/02	600 x 600 x 133	U15	14.9	583/130	13	0.09
15403505	MX15-HL12-905*600-01/02	905 x 600 x 133	U15	22.5	880/130	16	0.18
15403506	MX15-HL12-1210*600-01/02	1210 x 600 x 133	U15	30.2	1176/130	19	0.18

* Other sizes are available on request.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

HEPA/ULPA Panels

CPXRG - H13



Advantages

- Compact filter-diffuser for clean room
- Room side replaceable
- Individually tested according to EN 1822
- Adjustable damper disc
- Gel seal between filter and housing

Application: Microelectronic, hospitals.

Type: HEPA filter panel with mechanical seal.

Frame: Aluminium profile.

Gel: Polyurethane gel.

Media: Glass fibre.

Separator: Hot-melt.

Sealant: Polyurethane.

Faceguard: Expanded metal, powder coated white RAL 9016.

EN 1822:2009 filter class: H13.

MPPS efficiency: H13: $\geq 99.95\%$.

DOP efficiency: $\geq 99.99\%$.

Temperature: 70°C.

Fire rating: UL 900.

Filter

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
200694001	12CPXRG-24242	554 x 554 x 77	H13	8	435/130	3.8	0.02
200693001	12CPXRG-24362	859 x 554 x 77	H13	12.4	680/128	5.8	0.04
200691001	12CPXRG-24482	1164 x 554 x 77	H13	16.8	947/130	7.8	0.05

Housing

Reference	Type	Housing dimensions (WxHxD) mm	Filter dimensions (WxHxD) mm	Collar size ø mm	Unit Weight kg	Unit Volume m ³
410F-118995001	4CPX-24242-[]	600 x 600 x 140	554 x 554 x 77	ø 250	4.6	0.05
410F-118994002	4CPX-24362-[]	905 x 600 x 140	859 x 554 x 77	ø 250	6.6	0.08
410F-118992001	4CPX-24482-[]	1210 x 600 x 140	1164 x 554 x 77	ø 250	8.6	0.1

* Other dimensions, finishes and different options are available on request.

Summary Molecular Filtration



Compact 2-in-1 solution
CityPleat
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Compact 2-in-1 solution
CityFlo
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Compact 2-in-1 solution
CityCarb®
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Compact Molecular Filter
CitySorb
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Compact Molecular Filter
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Loose Filled Panels
CamSure
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Loose Filled Cylinders
CamCarb® Mounting Frames
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Gigapleat NXPC
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Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Why Molecular Filtration?

Air pollution caused by traffic, manufacturing, power plants, agriculture and even forest fires is a growing problem in our industrialized world.

Molecular gaseous compounds are invisible and all around us. Some of these compounds are so toxic, and yet so hard for us to detect, that they can do us harm with our even realizing we have been exposed.

Unfortunately we are routinely being subjected to such hazardous compounds in our offices, our homes, our cities and even during our leisure time.

The impact of such exposure can be significant. High ozone or volatile organic compound (VOC) levels represent a serious health threat for all of us. At the same time air pollution can damage everything from valuable artifacts in museums to exposed surfaces in our homes and offices.

In manufacturing environments Airborne Molecular Contamination (AMC) can cause a variety of problems. In semiconductor manufacturing, for example, AMC can reduce product yield, corrode valuable optical components and damage a wide range of process equipment.

In other industries, as products and processes become more complex and more sensitive to all types of contamination, the control of AMC will become an ever more critical part of ensuring product quality and improving process yield rates.



Additional services

Camfil offers a wide range of AMC focused services that allow our customers to remain focused on their core business. These services include filter life time analysis, real time online measurement of contaminants and passive sampling to precisely determine the type and concentration of the problem compounds.

Once local analysis has been completed our AMC experts can propose comprehensive AMC solutions based on the minimum possible Life Cycle Cost available to meet customer needs.

Camfil Farr is the only filter company equipped with a full size filter test facility designed to performance test not just filter media samples but also full size filters under precisely simulated conditions. This full size filter testing is the basis for all our published technical data and can be used to test filter performance against wide and varied range of AMC challenges under precise temperature, humidity and air flow conditions.

This type of performance data can be invaluable when it comes to determining the optimal solution for any specific AMC challenge

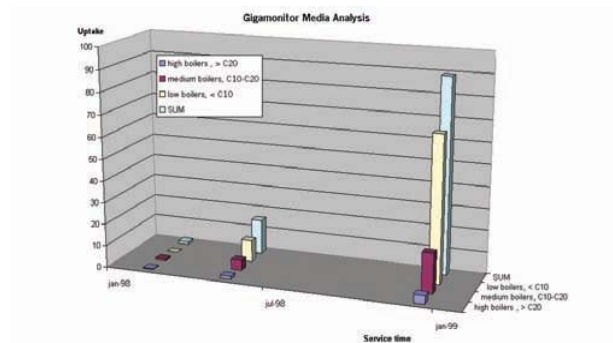


Picture: Filter test rig in Camfil AB, Sweden



Gigacheck

Campure Coupon



Example: Rest capacity check of a chemical filter in operation

Ozone Rating



Camfil Farr introduce an ozone removal efficiency classification for molecular filters.

Ozone may be removed from air by molecular filters. To help customers assess the effectiveness of different products, Camfil Farr introduce an ozone removal efficiency rating system. This is a first in the filtration industry.

Ozone

Ozone is a naturally occurring gas that is widely present in our environment at ground level. The ozone molecule is composed of three oxygen atoms, rather than the two atoms of normal oxygen. Ozone is formed by the interaction of other gaseous pollutants such as oxides of nitrogen and volatile organic compounds (VOCs) under the influence of ultraviolet (UV) light. City centre levels of ozone increase during periods of high sunlight. Ozone is classed as an oxidising agent, and has the potential to damage or destroy other molecules.

Ozone and human health

Ozone is an extremely reactive gas and inhalation of ozone can be harmful to human health. The presence of ozone in air may be readily correlated to hospital admission rates relating to respiratory illness. Symptoms of ozone exposure include; throat irritation, aggravation of asthma, decrease in lung function and increased susceptibility to respiratory infection. Ambient ozone levels and high alerts may be available on local government websites in many parts of the world.

Removing ozone from the air

Molecular filters reduce ozone levels in the air through processes of adsorption and decomposition.

Measuring ozone removal efficiency

Camfil Farr use a unique test rig to measure ozone removal efficiency. Temperature and relative humidity conditioned air is blown through full size production filters. Ozone is injected into the airstream and sensitive ozone detectors measure the concentration upstream and downstream of the filter. Filter efficiency is readily calculated from the up-and downstream ozone concentrations.

Camfil Farr are market leaders in the validation of performance of molecular filters. Filters can be challenged with many different gases and vapours. Using temperatures between 5 and 50 deg C and relative humidity values between 30% and 90%, we can determine the performance of our filters under the conditions present in our customer applications.



Filter Type	Average Ozone Removal Efficiency	Ozone Rating
City-Flo XL	35%	3
CityPleat 200 2"	55%	5
CityPleat 480 4"	65%	6
CitySorb	70%	7
City-Flo	80%	8
RigaCarb 205	85%	8
CityCarb	90%	9
RigaCarb 201	90%	9

i) All filters tested at 2.5 m/s face velocity (500 fpm); ii) Ozone challenge = 150 – 450 ppb; iii) Temperature = 22 deg C; iv) Relative humidity = 50%

All the filters use a high quality broad spectrum adsorbent, based on activated carbon to destroy the ozone molecules. Laboratory tests show that filters based on the use of potassium permanganate, which is itself a strong oxidising agent are unlikely to be as effective.

Our “City” - Products

Sick-Building-Syndrome

Sick-Building-Syndrome is the negative impact on health of human beings caused by harmful substances.

The sources of harmful substances are outside e.g. traffic, power plants, industrial manufacturing, forest fires and bacteria. Inside of buildings e.g. furniture's, coatings, carpets and detergents.

All these chemical, harmful substances together can cause headache, fatigue, allergy and decreasing concentration.

Our 2-in-1 principle

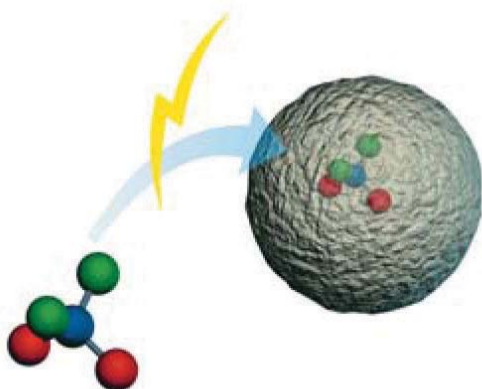
Our CityPleat, CityFlo and CityCarb filter are able to remove particles, bacteria, spores, air pollution and smell. As a result the indoor air quality (IAQ) index is significantly improved.

This improvement is due to:

1. High efficiency particle filtration: filter class F7 / F9 according EN 779.
2. Adsorption of volatile organic compounds (VOC) including smell, sulfur dioxide and ozone: High efficiency through RAD principle.

RAD Principle

RAD stands for Rapid Adsorption Dynamics and is the basis for high efficiency gas filtration. Our filters are able to remove effectively smell and gaseous air pollutants. Ozone for instance is removed with an efficiency higher than 90% thanks to the high efficiency media used in Citycarb. Camfil is using best-in class media to achieve a relative long life time of the filters.



Easy installation

Our filters can be easily installed due to the customer friendly HF frame set. The “City” filters can be normally installed in the existing bag filter frames.

Active against dust, air pollution and smell with only one filter!



Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

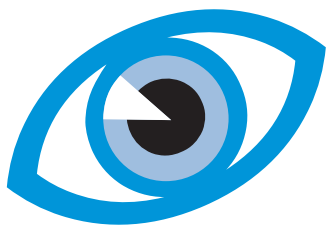
Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

Adsorption Index of Activated Carbon



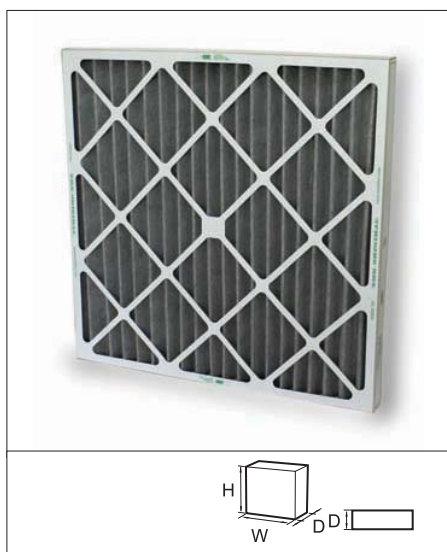
Key:

- 4: A very high level of adsorption
- 3: Good index, increased contact time may be needed.
- 2: Mediocre index that may require a particularly long contact time or impregnated grades.
- 1: Practically no adsorption, another solution must be sought

Adsorption Index of Activated Carbon For Various Types of Odour

2 Acetaldehyde	1 Carbon monoxide	3 Ethyl bromide	4 Lubricants	3 Pentylene
4 Acetic acid	4 Carbon tetrachloride	1 Ethylene	4 Medicinal odours	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 odours	2 Methyl alcohol	3 Phosgene
4 Acrylonitrile	3 Cigarette smells	3 Farmyard smells	3 Methyl bromide	4 Plastics
4 Adhesives	4 Cleaning solvents	4 Fertiliser	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 odours	4 Methylcyclohexane	2 Propylene
2 Ammonia	4 Cresol	4 Floral odours	4 Methylcyclohexanol	4 Propyl mercaptan
2 Amyl acetate	4 Cyclohexane	2 Formaldehyde	4 Methylcyclohexanone	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 Anaesthetics	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 odours	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 odours	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 odours	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 odours
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 sulphide	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 odours	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 Ethylbenzene	4 Lactic acid	4 Pentanone	

CityPleat



Advantages

- Compact “2-in-1” solution
- Double action: particle and odour filtration
- Ideal for filtering most low concentration interior and exterior pollutants
- 100% incinerable
- Can be used to upgrade existing installations
- Range of standard sizes

Application: High efficiency particle filtration for deodorisation and removal of gas pollutants, used for filtration in offices, airports.

Type: Prefilter for gas and particles removal.

Frame: Moisture resistant cardboard.

Media: Synthetic fibre and broad spectrum carbon.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 7.

Recommended temperature: 0 - 40°C.

Recommended relative humidity: 30 - 70%.

Recommended final pressure drop: 250 Pa.

Maximum final pressure drop: 350 Pa.

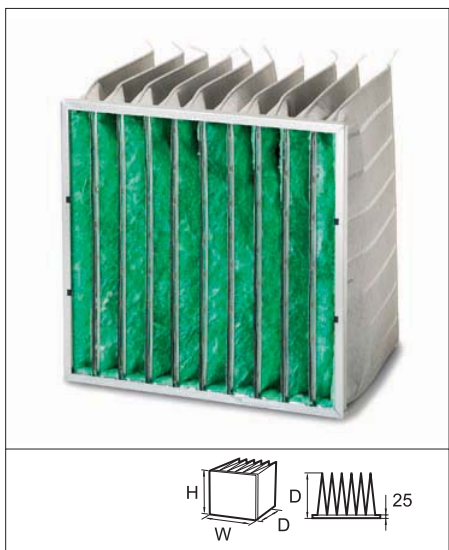
Ozone removal efficiency: 50 - 70% depending on model and air flow.

All values are $\pm 15\%$.

Reference	Model	Dimensions (WxHxD) mm	Particle removal filter class	Average ozone removal efficiency at rated airflow (%)*	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
5103001	CityPleat-100-594x594x44	594 x 594 x 44	G4	55%	1900/135	1.0	0.019
5103007	CityPleat-100-289x594x44	289 x 594 x 44	G4	55%	900/135	0.5	0.010
5103005	CityPleat-200-594x594x44	594 x 594 x 44	G4	55%	3175/135	1.8	0.019
5103004	CityPleat-200-289x594x44	289 x 594 x 44	G4	55%	1500/135	0.9	0.10
5103011	CityPleat-200-594x594x95	594 x 594 x 95	G4	55%	3175/110	2	0.039
5103008	CityPleat-200-289x594x95	289 x 594 x 95	G4	55%	1500/110	1	0.019
5103010	CityPleat-480-594x594x95	594 x 594 x 95	G4	65%	3175/90	3.8	0.039
5103009	CityPleat-480-289x594x95	289 x 594 x 95	G4	65%	1500/90	1.9	0.019

* Full size test in Camfil Farr molecular filtration test rig.

City-Flo



Advantages

- Range of standard sizes
- Can be used to upgrade existing installations
- Ideal for filtering most low concentration interior and exterior pollutants
- Robust metal header frame
- Double action: particle and molecular filtration

Application: Particle and odour removal in Hospitals, Offices, Airports etc.

Type: Multi pocket particle and gas filter.

Frame: Galvanised steel.

Media: Glass fibre and broad spectrum carbon (RAD).

EN 779:2002 filter class: F7.

ASHRAE 52.2:2007 filter class: MERV 13.

Recommended temperature: 50°C maximum in continuous service.

Recommended relative humidity: 70% RH maximum.

Holding frames: Front and side access holding frames are available: Type 8 and FC Housings.

Recommended final pressure drop: 250 Pa.

Maximum final pressure drop: 450 Pa.

Ozone removal efficiency: 80%.

Filter also available with F9 media.

Reference	Dimensions (WxHxD) mm	Filter classification EN 779:2002	Average ozone removal efficiency at rated airflow (%)*	Number of pockets	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
604001	592 x 592 x 534	F7	80%	10	6.2	3400/140	6	0.05
604003	490 x 592 x 534	F7	80%	8	5	2550/140	4.6	0.05
604002	287 x 592 x 534	F7	80%	5	3.1	1700/145	3.5	0.03

Well known bag filter construction is now available with a particle and gas filtration layer. The frame components are made of galvanized sheet metal to ensure a robust construction.

Ultimate solution

City-Flo is the ultimate solution when a high performance bag filter and a high performance odour removal filter are needed in the same encapsulated space. The filter can be easily fitted into new or existing standard filter frames. High performance Camfil Farr glass fibre media is now combined with an exclusive broad spectrum carbon media that utilises the benefits of RAD (Rapid Adsorption Dynamics) to remove a wide range of VOCs and odours.

1. Highly effective filtration: Classed as F7 according to EN779:2002, it stops 85% of 1 micron particles and meets the recommendations of UNICLIMA and EUROVENT 12/1-92.
2. Adsorption of odours and pollution: This specifically designed product can provide very high efficiencies for ozone, Polyaromatic Hydrocarbons (PAH) and organic contaminants, which are the main pollutant in urban environments.

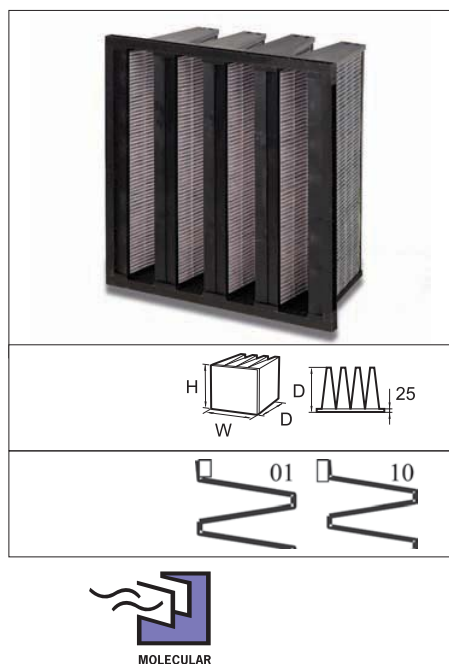
Service life

The filter can be replaced when pressure loss exceeds the maximum allowed value for the ventilation system or after a maximum of one year.

Maintenance

Following good practice for all filters, used City-Flo filters should be bagged immediately after removal from the unit and disposed of by the appropriate route.

CityCarb®



Advantages

- Compact “2-in-1” solution
- Double action: particle and molecular filtration
- Ideal for filtering most low concentration interior and exterior pollutants
- 100% incinerable
- Can be used to upgrade existing installations
- Range of standard sizes

Application: High efficiency particle filtration for deodorisation and removal of gas pollutants, used for filtration in e.g. offices, airports and industrial workshops.

Type: High efficiency, activated carbon, incinerable filter.

Frame: Polypropylene, 25mm flange, 21mm on request.

Media: Synthetic fibre and broadspectrum carbon (RAD).

Sealant: Polyurethane.

Gasket: Seamless PU gasket.

EN 779:2002 filter class: F7.

ASHRAE 52.2:2007 filter class: MERV 13.

Recommended temperature: 50°C maximum in continuous service.

Recommended relative humidity: 70% RH maximum.

Maximum flow rate: 4000m³/h.

Mounting system: “Camfil holding frame” frames in kit form, FC type housings.

Recommended final pressure drop: 250 Pa.

Maximum final pressure drop: 450 Pa.

Ozone removal efficiency: 90%.

Reference	Dimensions (WxHxD) mm	Filter classification EN 779:2002	Average ozone removal efficiency at rated airflow (%)	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
56700001	592x592x292	F7	90%	8	3400/120	9.8	0.13
56700010	592x490x292	F7	90%	6.6	2800/120	8.2	0.13
56700002	592x287x292	F7	90%	3.5	1400/120	4.9	0.06

1. Highly effective filtration: Classed as F7 according to EN 779:2002, it stops 85% of 1 micron particles and meets the recommendations of UNICLIMA and EUROVENT 12/1-92.
2. Adsorption of odours and pollution: This specifically designed product can provide very high efficiencies for ozone, Polyaromatic Hydrocarbons (PAH) and organic contaminants, which are the main pollutant in urban environments.

CityCarb is designed to fit in place of the existing pocket or compact filter within an air handling system. The existing frames can be used because the filter fixings are the same and as you are not adding an extra filter stage, the pressure drop remains low.

The RAD or Rapid Adsorption Dynamic ensures the optimum efficiency of CityCarb. Rather than the amount of carbon (the traditional measure), it is the capacity of this new form to rapidly trap gasses which ensures the advanced performance of CityCarb. The carbon is in the form of very small granules into which gas molecules can rapidly diffuse.

CityCarb is specifically designed to handle common substances found in atmospheric contamination:

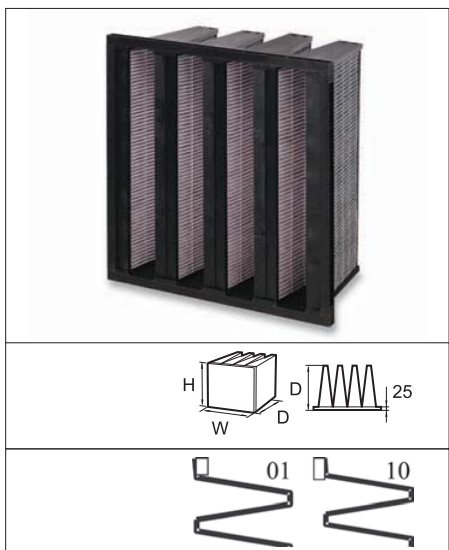
- Volatile Organic Compounds (VOC's) are caused by vehicle exhaust, solvents and aerosols.
- PAH and ozone is caused by vehicle emissions
- Butadiene 1.3 is caused by vehicle emissions.

Some of these molecules are included in the calculation of the atmospheric pollution index.

CityCarb is also available with a media for acid removal.

The filter can be replaced when pressure loss exceeds the maximum allowed value for the ventilation system or after a maximum of one year. Following good practice for all filters, used CityCarb filters should be bagged immediately after removal from the unit and disposed of by the appropriate route.

CitySorb



Advantages

- Compact solution
- Rigid design concept
- High efficiency
- Incinerable
- Large air flow capacity
- Constant pressure drop
- Range of standard sizes

Application: Adsorption of odours and gasses in air conditioning applications.

Type: Rigid pleated filter.

Frame: Polystyrene, 25mm flange, 21mm on request.

Media: Multilayer carbon media.

Sealant: Polyurethane.

Gasket: Seamless PU gasket.

Recommended temperature range: 0 - 40°C.

Recommended relative humidity: < 70% RH.

Recommended pressure drop: Constant if filter is protected by F7 particle filtration.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Ozone removal efficiency: 70%.

Reference	Model	Dimensions (WxHxD) mm	Average ozone removal efficiency at rated airflow (%)	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
56700003	242412-01PU	592 x 592 x 292	70%	8	3400/80	10.8	0.13
56700004	242012-01PU	592 x 490 x 292	70%	6.6	2800/80	9.2	0.13
56700005	241212-01PU	592 x 287 x 292	70%	3.5	1500/80	5.4	0.06

CitySorb is a high-efficiency compact molecular filter for addressing IAQ issues in public and commercial buildings. This filter satisfies demands to tackle nuisance odours such as PAH, ozone and butadiene 1.3 caused by vehicle emissions and VOCs from vehicle exhaust, solvents and aerosols and provide occupants with the highest indoor air quality as specified in the European Standard EN 13779. The material selection and construction method ensures that CitySorb is a clean, light filter that is both quick and easy to maintain.

CitySorb uses a special ingredient - RAD

RAD or Rapid Adsorption Dynamic ensures the optimum efficiency of CitySorb. Rather than the amount of carbon (the traditional measure), it is the capacity of this new form to rapidly trap gasses which ensures the advanced performance of CitySorb. The carbon is in the form of very small granules into which gas molecules can rapidly diffuse. Also available, CitySorb Acid, for more efficient treatment of specific acid molecules.

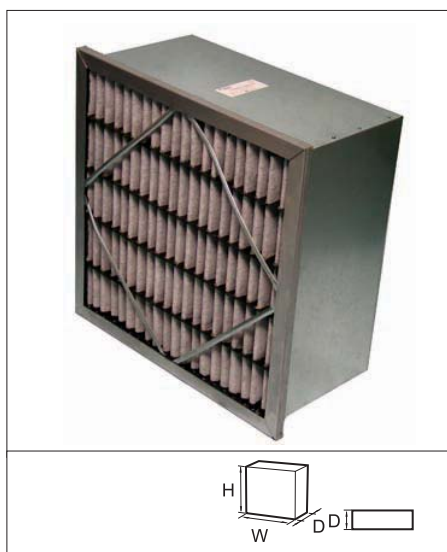
Service life

The filter can be replaced after a maximum of one year or when the smell or problem reappears.

Maintenance

Following good practice for all filters, used CitySorb filters should be bagged immediately after removal from the unit and disposed of by the appropriate route.

Riga-Carb



Advantages

- Available as box type, single or double header
- Compact solution with low pressure drop
- Standard design for removal of acids, alkalines, organic smells and condensable organics.

Application: Adsorption of gases for industrial application such as harddisk facilities.

Type: Disposable carbon filter.

Frame: Galvanised steel (other on request).

Media: Type 202: nonwoven fiber material with impregnated carbon for removal of acids.

Type 204: nonwoven fiber material with impregnated carbon for removal of alkalines.

Recommended temperature: 0 - 40°C.

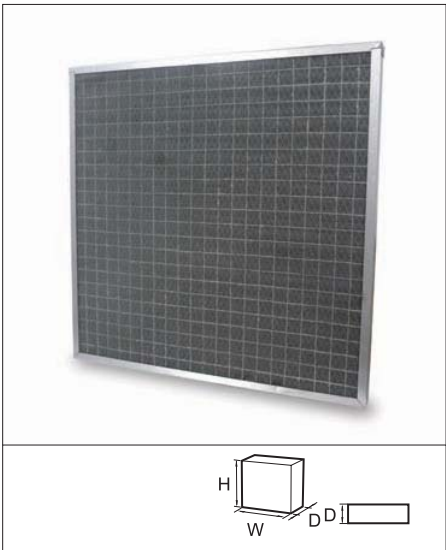
Recommended relative humidity: 30 - 70%.

Particle cleanliness: ISO Class 6.

Reference	Model	Dimensions (WxHxD) mm	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
5640001	RC-202-24-24-12-BH	592 x 592 x 292	6	3400/124	15	0.1
5640010	RC-202-12-24-12-BH	287 x 592 x 292	3.2	1700/124	8	0.05
5640006	RC-202-24-24-12-PH	592 x 592 x 292	6	3400/124	15	0.1
5640004	RC-202-12-24-12-PH	287 x 592 x 292	3.2	1700/124	8	0.05
5640002	RC-204-24-24-12-BH	592 x 592 x 292	6	3400/124	15	0.1
5640012	RC-204-12-24-12-BH	287 x 592 x 292	3.2	1700/124	8	0.05
5640011	RC-204-24-24-12-PH	592 x 592 x 292	6	3400/124	15	0.1
5640005	RC-204-12-24-12-PH	287 x 592 x 292	3.2	1700/124	8	0.05

BH: Double Header; PH: Single Header

CamSure



Advantages

- Range of standard and non-standard sizes
- High performance
- Suitable for a wide range of air volumes

Application: Adsorption of odours and gases in air conditioning applications.
Type: Loose fill adsorbent panels.
Frame: Galvanised steel.
Media: Campure or activated carbon based materials.
Temperature: 40°C maximum in continuous service.
Recommended relative humidity: 30 - 70%.
Mounting systems: Front and side access housings and frames are available.

Reference	Model	Dimensions (WxHxD) mm	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
5100003	RS80-D-LGS048	594 x 594 x 47	850/70	7.5	0.017
5100004	RS80-D-LGS048	594 x 289 x 47	425/70	4	0.0083

Above are sample sizes, filters are available in a comprehensive range of sizes, please specify.
Also available with stainless steel case.

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Efficient Gas Filtration With Camcarb

Advanced, high capacity media is used in the CamCarb cylinders to remove smell, corrosive and toxic gases as well as organics in make-up and exhaust air applications.

CamCarb design

Camfil Farr offers a wide range of high efficient media tailored to the customer requirements. Camfil Farr experts select the right CamCarb model and the best suitable media based on lowest cost-of-ownership to fulfill customer requirements. .

Non impregnated activated carbon is typically used to remove volatile organic compounds (VOC) including smell whereas typically impregnated activated carbon is used to remove acidic, caustic and corrosive gases.

Multiple gas filtration with one, two or three filter stages in series can be achieved in applications with unknown gas mix or when for instance VOC's acids and bases are present in the same air stream. Media blends are also available

A special designed holding plate system is used as installation frame for the CamCarb cylinders (CamCarb and CamCarb green). The system is available in three different standard sizes.

It is recommended to use a F7 pre-filter to protect the CamCarb system against particle contamination. Particles in the air block the micro pores of the high efficient activated carbon resulting in rapid performance decrease.

Enforcement of the holding plates is required in big scale CamCarb installations (e.g. make-up air unit). Camfil Farr offers the right stabilization solution with the RZA/MZA modular frame set.

CamCarb refill service for better operational cost and to protect the environment

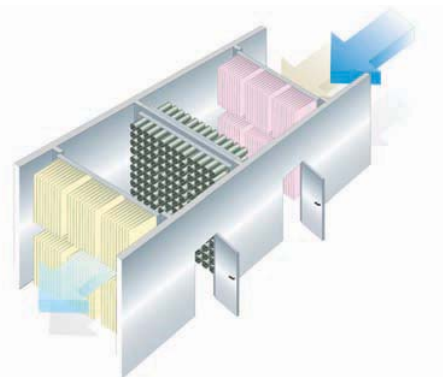
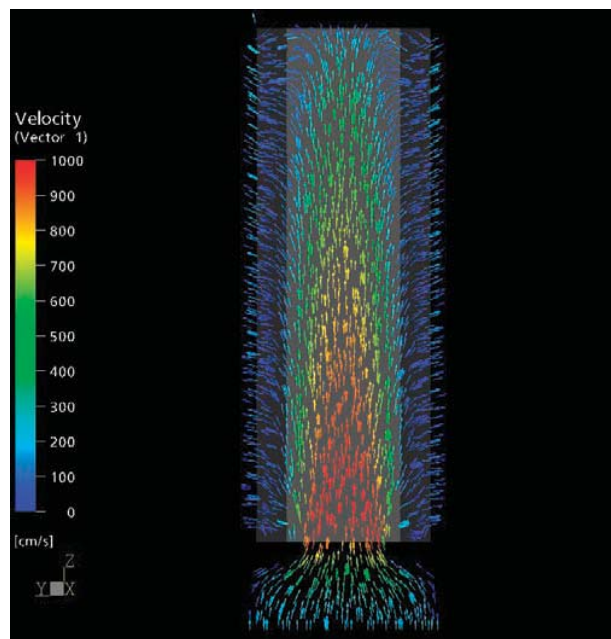
The CamCarb cylinders can be emptied and refilled with new media. This service offers lower operational cost compared to the replacement of the whole cylinder.

Camfil guarantees the same performance of the CamCarb cylinder after the refill service due to special filling technology as well as in-house QA.

A spare set of cylinders is required to maintain the system operation during the filling process

CamCarb air flow distribution

Camfil did CFD (Computer Fluid Dynamics) simulations to design the Camcarb cylinder to achieve a uniform air flow distribution through the media resulting in longer life time compared to competitor products.

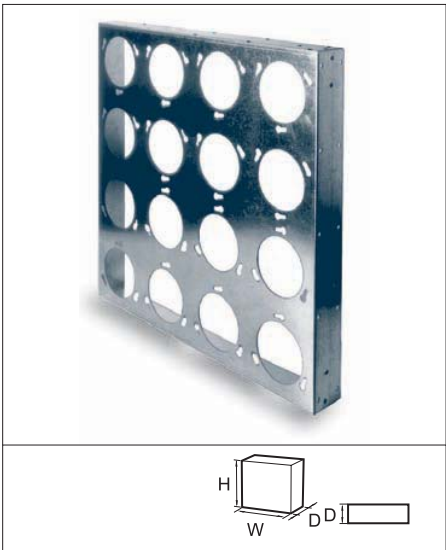


Example of RZA/MZA modular frame set system



Application in make-up air unit

CamCarb® Mounting Frames



Advantages

- Modular design adaptable for all types of installations
- Reduced weight
- Rapid fitting system via bayonet fitting
- Quick and easy service

Application: Assembly of Camcarb cylinders.
Type: Quick bayonet-mounted support frame for Camcarb cylinders.
Design: Galvanised steel or stainless steel.
For filters: Camcarb cylinders (Green or Metal).
Mounting: Bayonet locking.

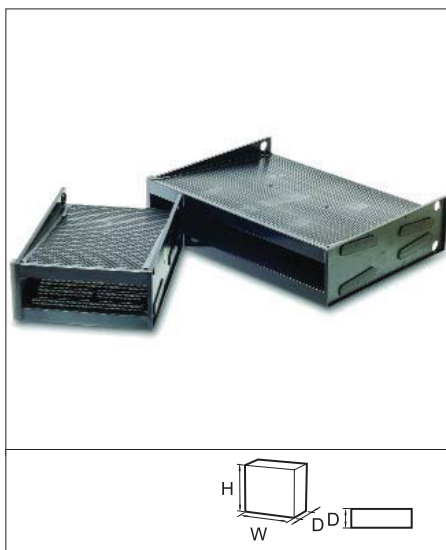
Type	Model	Dimensions (WxHxD) mm	Cylinder capacity	Unit Weight kg	Unit Volume m³
Camcarb	Frame G8 SS	305 x 610 x 70	8	5	0.02
Camcarb	Frame G12 SS	457 x 610 x 70	12	5.7	0.03
Camcarb	Frame G16 SS	610 x 610 x 70	16	6	0.04

RZA, MZA and ZWB installation accessories are also available on request



As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

CamPure® GDM Green Disposable Modules



Advantages

- Completely incinerable
- Various medias available dependent upon the contaminant(s) of concern
- Retrofit of existing installations
- Low pressure drop

Description: Disposable plastic adsorber module designed to remove corrosive gases from industrial or commercial environments.

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

Efficiency: Media selection dependent, consult factory.

Adsorbent: "Broad Spectrum" activated carbon, adsorption of odours, ozone and organic gases. Impregnated activated carbon or campure impregnated alumina for adsorption of both organic and inorganic gases.

Temperature: Maximum continuous operating temperature of 50°C.

Recommended relative humidity: 30 - 90%.

Type	Dimensions (WxHxD) mm	Airflow / pressure drop m ³ / hr / Pa	Media volume	Application
GDM 300F	600 x 295 x 300	425/75	27L	Make up air-handling units (MUA), recirculation air handling units, exhaust.
GDM 300H	300 x 295 x 300	212/75	13.5L	Make up air-handling units (MUA), recirculation air handling units, exhaust.
GDM 440F	600 x 145 x 440	700/50	13.5L	Make up air-handling units (MUA), recirculation air handling units, exhaust.
GDM 440H	300 x 145 x 440	350/50	6.75L	Make up air-handling units (MUA), recirculation air handling units, exhaust.

* Housings are available on request.

Activated Carbon and Campure Media

Effective molecular filtration media

A comprehensive range of molecular filtration medias for the control of corrosive gases, toxic gases, odours and other gaseous pollutants. The medias may be used as part of original equipment packages or as replacement for spent media.

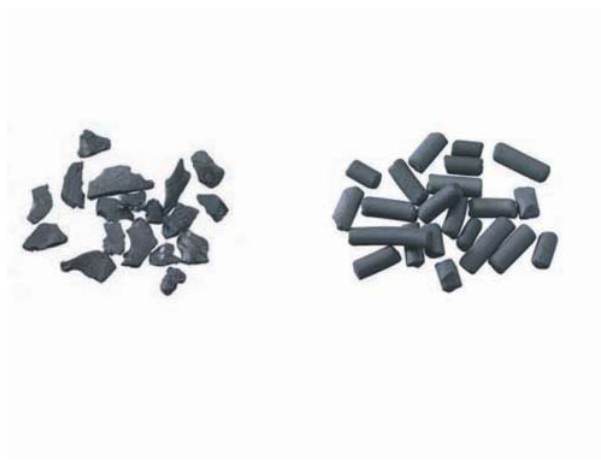
The campure media range comprises chemically impregnated adsorbents based on activated alumina which may be use on their own or blended with activated carbon.



Demanding applications

Campure medias are designed for the most difficult and demanding applications in industrial and commercial environments. The principal areas of use include the control of acidic gases in pulp and paper, oil refining, and steel production industries. If left untreated, acidic gases

such as hydrogen sulphide, sulphur dioxide, chlorine and oxides of nitrogen may cause serious damage to key electrical equipment essential to process management. Other applications include the control of acidic and odorous gases in waste water treatment applications and the protection of sensitive artefacts in museums and art galleries.



Flexible filtration solutions and support services

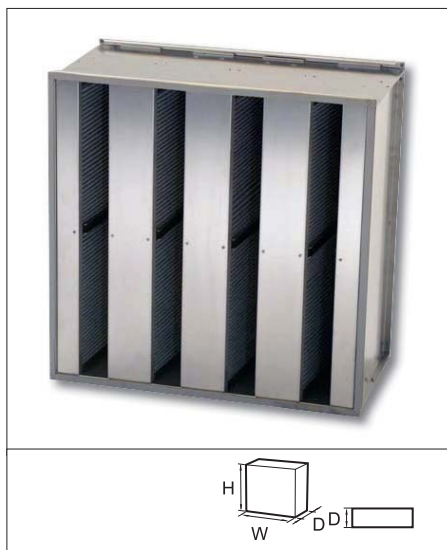
Activated carbon and campure medias may be deployed in a range of Camfil Farr hardware systems. These allow standard and custom, solutions for all industrial and commercial applications using various media amounts and bed depths. Activated carbon and campure medias may be re-filled directly into other manufacturers hardware.

These medias are supported by a comprehensive range of technical support services including: media life analysis, corrosion monitoring coupons, on-line monitoring and media handling.

Media	Target gases	Media type
CEX003 CEX004	VOCs, hydrocarbons, general odours	Extruded activated carbon, 3 and 4mm diameter (coal based)
LGS036 LGS048	Light VOCs, hydrocarbons, general odours	Granular activated carbon (coconut shell based)
Impregnated Carbon	Acids, Alkalines, etc.	A wide range of impregnation is available.
Campure 4	H ₂ S, SO ₂ , NOX, formaldehyde, ethylene, light VOCs, Blow mol. Wt. aldehydes and organic acids	H ₂ S, SO ₂ , NOX, formaldehyde, ethylene, light VOCs, low mol. Wt. aldehydes and organic acids
Campure 5	Halogens, halogen acids and organic halides	Activated alumina with chemical impregnation
Campure 8	Enhanced removal of H ₂ S, SO ₂ , NOX, formaldehyde, ethylene, acid gases	Activated alumina with chemical impregnation
Campure 15	H ₂ S, SO ₂ , mercaptans, acid gases, chlorine	Activated alumina and activated carbon with chemical impregnation
Blends	Any of the Campure medias may be blended with either of the activated carbon based medias to provide an adsorption system that combines broad spectrum and highly specific characteristics. The usual blend ratio is 50/50 by volume.	

See individual data sheets for grade specifications

Gigapleat XPC



Advantages

- Exchangeable panels
- Reduced waste through re-usable housing
- Dual layer solution for removal of multiple gases (acids, alkalines, sulfur and organic compounds)
- Compact solution
- High media cleanliness

Application: Clean room recirculation air and clean room make up air.

Type: Compact filter with exchangeable panels.

Housing: Stainless steel. Removable sheet metal profiles for panel replacement.

Gasket: Polyurethane gasket. Position: 01 = downstream, 10 = upstream.

Sealant: Polyurethane.

Configuration: 2 layers of 8 panels / full size housing.

Recommended temperature range: 10 - 40°C.

Recommended relative humidity: 30 - 70%.

Particle cleanliness: ISO Class 6.

Reference	Type	Model	Dimensions (WxHxD) mm
56600000	housing	Gigapleat XPC 610 x 610 x 292 s/s Housing	610 x 610 x 292
56600002	housing	Gigapleat XPC 305 x 610 x 292 s/s Housing	305 x 610 x 292

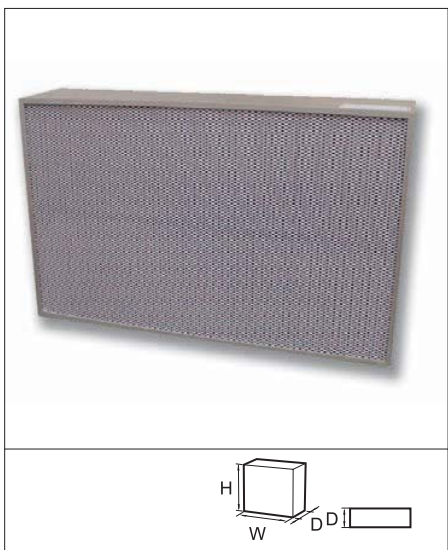
Reference	Type	Model	Dimensions (WxHxD) mm	Airflow / pressure drop m ³ / hr / Pa	Target Gas
56300016	Gigapleat	XPC A3 Panel	For housing 610 x 610 x 292mm	2600/95	Impregnated activated carbon for alkalines / organic condensables / Ozone
56300004	Gigapleat	XPC B2 Panel	For housing 610 x 610 x 292mm	2600/95	Ion exchange resin for alkalines
56300015	Gigapleat	XPC C3 Panel	For housing 610 x 610 x 292mm	2600/95	Impregnated activated carbon for acids like H ₂ S, SO ₂ , HCl, HF / organic condensables / Ozone
56300011	Gigapleat	XPC L3 Panel	For housing 610 x 610 x 292mm	2600/95	Activated carbon for organic condensables / Ozone

* Other media types are available on request.

AMC vs Media Type	L	B	A	C
Acids				YES
Bases		YES	YES	
Condensables (B.Pt > 150 deg. C)	YES		YES	YES
Dopants (Organophosphates)	YES		YES	YES
Dopants (BF ₃)				YES
Organics (B.Pt < 150 deg. C)	YES			
Ozone	YES		YES	YES

Gigapleat

Gigapleat NXPP



Advantages

- Extremely low pressure drop
- High media cleanliness
- Aluminium frame
- Extremely small form factor
- Low weight
- Multiple media types can be combined into the same filter

Application: For cleanroom ceiling, FFU, mini-environment or process equipment.

Type: Panel filter.

Frame: Aluminium.

Media: Pleated ion exchange media, pleated impregnated carbon media for alkaline, acidic and VOC gas removal.

Sealant: Polyurethane.

Gasket: 01 = Downstream polyurethane gasket, 10 = Upstream polyurethane gasket.

Faceguard: 02: Downstream faceguard; 20: Upstream faceguard.

Recommended temperature range: 10 - 40°C.

Recommended relative humidity: 30 - 70%.

Particle cleanliness: ISO Class 6.

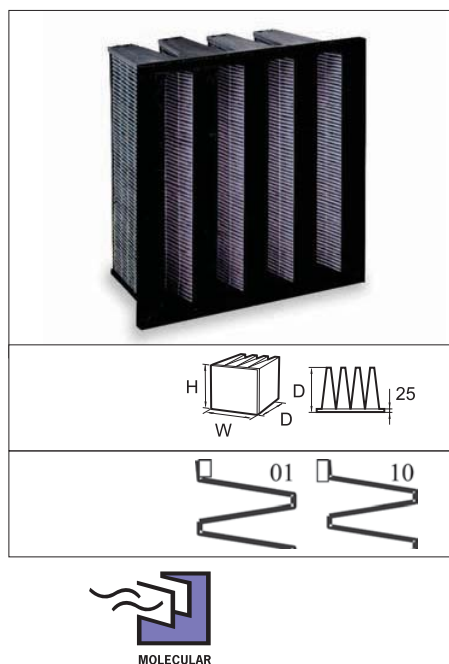
Type	Model	Dimensions (WxHxD) mm	Pressure Loss at 0.4m/s Pa	Performance	Unit Weight kg	Unit Volume m ³
Gigapleat	NXPP-LBC.610x610x165.KD.01/22	610 x 610 x 165	40	on request	10	0.061

* Adapter frames for FFU installation are available on request. For filter dimensioning please contact Camfil Farr.

AMC vs Media Type	L	B	A	C
Acids				YES
Bases		YES	YES	
Condensables (B.Pt > 150 deg. C)	YES		YES	YES
Dopants (Organophosphates)	YES		YES	YES
Dopants (BF ₃)				YES
Organics (B.Pt < 150 deg. C)	YES			
Ozone	YES		YES	YES

Gigapleat

Gigapleat NXPH



Advantages

- Low pressure drop
- High media cleanliness
- Plastic frame with high chemical resistance and low out-gassing

Application: Cleanroom recirculation air, clean room make up air.

Type: Rigid pleated filter.

Frame: Polystyrene.

Media: Pleated ion exchange media, pleated impregnated carbon media for alkaline, acidic, and VOC gas removal.

Sealant: Polyurethane.

Gasket: Polyurethane gasket, 01 = downstream, 10 = upstream.

Recommended temperature range: 10 - 40°C.

Recommended relative humidity: 30 - 70%.

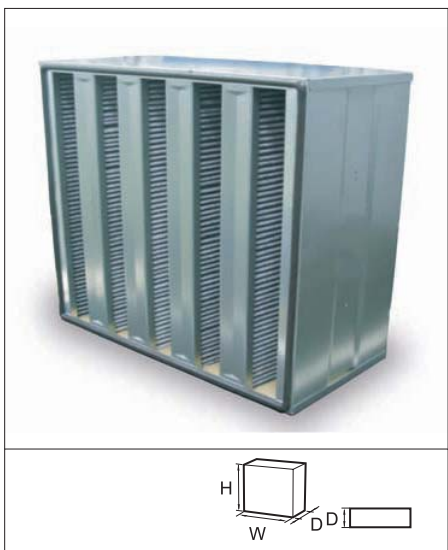
Particle cleanliness: ISO Class 6.

Reference	Type	Model	Dimensions (WxHxD) mm	Airflow / pressure drop m ³ / hr / Pa	Approximate Unit Weight kg	Unit Volume m ³
56000003	GIGAPLEAT	NXPH-A3 242412-01PU	592 x 592 x 292	2600/60	12	0.13
56002000	GIGAPLEAT	NXPH-A3 241212-01PU	592 x 287 x 292	1100/60	6.5	0.06
56015001	GIGAPLEAT	NXPH-B2 242412-01PU	592 x 592 x 292	2600/50	12	0.13
56015002	GIGAPLEAT	NXPH-B2 241212-01PU	592 x 287 x 292	1100/50	6.5	0.06
56005009	GIGAPLEAT	NXPH-C3 242412-01PU	592 x 592 x 292	2600/60	12	0.13
56005010	GIGAPLEAT	NXPH-C3 241212-01PU	592 x 287 x 292	1100/60	6.5	0.06
56010009	GIGAPLEAT	NXPH-L3 242412-01PU	592 x 592 x 292	2600/60	12	0.13
56010005	GIGAPLEAT	NXPH-L3 241212-01PU	592 x 287 x 292	1100/60	6.5	0.06

* Combination media for removal of particle and gas are also available.

For media table, please refer to Gigapleat XPC, NXPP or NXPC.

Gigapleat NXPC



Advantages

- Low pressure drop
- Long service life
- High media cleanliness

Application: Cleanroom recirculation and MUA applications for AMC removal

Type: Compact filter.

Frame: ABS, GI, aluminium or stainless steel.

Media: Pleated ion exchange media, pleated impregnated carbon media for alkaline, acidic and VOC gas removal.

Sealant: Polyurethane.

Gasket: Polyurethane gasket, 01 = downstream, 10 = upstream.

Recommended temperature range: 10 - 40°C.

Recommended relative humidity: 30 - 70%.

Particle cleanliness: ISO Class 6.

Model	Dimensions (WxHxD) mm	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
GIGAPLEAT.NXPC 610x610x292-B2-01PU	610 x 610 x 292	2600/50	15	0.13

Combination media for removal of particle and gas are also available.

AMC vs Media Type	L	B	A	C
Acids				YES
Bases		YES	YES	
Condensables (B.Pt > 150 deg. C)	YES		YES	YES
Dopants (Organophosphates)	YES		YES	YES
Dopants (BF ₃)				YES
Organics (B.Pt < 150 deg. C)	YES			
Ozone	YES		YES	YES

Summary Frames, Housings and Specialty Filters



Terminal Filter Housings
Pharmaseal AP
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Terminal Filter Housings
Pharmaseal Exhaust AP
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Terminal Filter Housings
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Filter Containment Systems
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Filter Containment Systems
CamBox
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Filter Housing
FCBS-HF
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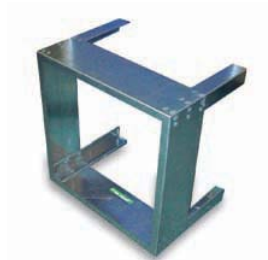
Filter Housing
FCBS-A
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Filter Housing
FCBL-CC
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Absolute Filter Holding Frame
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Absolute® 1FRK
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Filters for Painting Booths
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Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and specialty filters

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Summary Frames, Housings and Speciality Filters



Filters for Gas Turbines

30/30 GT

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Filters for Gas Turbines

30/30® WR

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Filters for Gas Turbines

CamClose

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Filters for Gas Turbines

Hi-Cap® Green HF 90/35

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Filters for Gas Turbines

Cam-Flo XMGT

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Filters for Gas Turbines

Cam GT®

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Filters for Gas Turbines

Cam GT® Box Type

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Filters for Gas Turbines

CamPulse GT Hemipleat

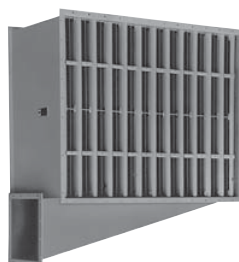
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Filters for Gas Turbines

Tenkay Hemipleat

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Filters for Gas Turbines

Dynavane

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Dust collector

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Dust collector

HemiPleat Goldcone Cartridges

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As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5

Bag and Compact Filters,
Class F5 to F9

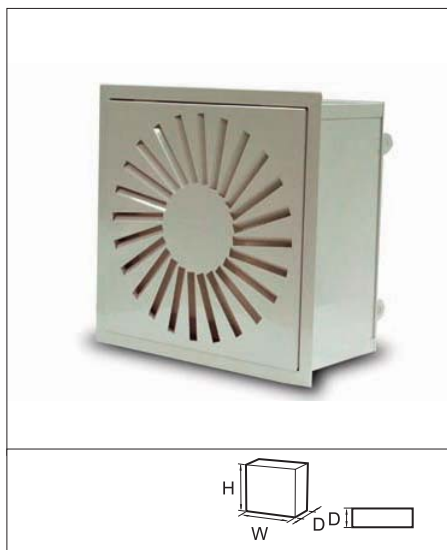
HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and speciality filters

Terminal Filter Housings

Pharmaseal AP



Advantages

- Includes all essential features for pharmaceutical and health care applications.
- Quick filter change, quick upstream aerosol injection & dispersion, quick aerosol sampling and pressure test.
- In-situ scanning with local penetration $\leq 0.01\%$ (typically) is guaranteed.
- Heavy duty aluminium fully welded to ensure air-tight housing.

Application: Non-unidirectional (turbulent) airflow clean rooms in pharmaceutical and health care applications.

Type: Ceiling-mount ducted, room-side operable air supply module with gel-seal HEPA/ULPA filters and butterfly damper.

Construction: Casing of 2.5mm extruded aluminium with fully welded joints, powder coated as standard.

Filter seal: Self-healing, non-flowing polyurethane gel or optional silicon gel approved by Camfil Farr for pharmaceutical applications.

Duct connection: Mould drawn one piece, seamless aluminium inlet collar sealed airtight to the back plate.

Damper: Room side adjustable heavy duty butterfly assembly with air diffusion disk for even airflow distribution.

Challenge aerosol: Quick-connect airtight aluminium port at room side. Integrated aerosol dispersion assembly for even aerosol distribution.

Upstream aerosol sampling and pressure measurement: At room side, a quick-connecting airtight port for pressure drop measurement and upstream aerosol quick sampling to determine if the upstream aerosol concentration is sufficient for filter scanning test downstream.

Faceguard: Stainless steel or aluminium diffuser with swirling blades, perforated style diffuser available as option, powder-coated if required.

Installation: Suspended by 4 lifting eyes or rested on ceiling grid.

Model designation	Housing size (WxHxD) mm	HEPA size (WxHxD) mm	Inlet collar diameter (mm)	Rated air flow / initial pressure drop m ³ /h / Pa	In-situ scanning local min. efficiency @ 0.3µm
PHAP-1090x695-A-SC1-***-*** ***_***_***_***_***	1090 x 695 x 250	1030 x 635 x 110	350	2000/215	99.99%
PHAP-822x695 -A-SC1-***-*** ***_***_***_***_***	822 x 695 x 250	762 x 635 x 110	350	1500/215	99.99%
PHAP-695x695 -A-SC1-***-*** ***_***_***_***_***	695 x 695 x 250	635 x 635 x 110	305	1250/215	99.99%
PHAP-695x580 -A-SC1-***-*** ***_***_***_***_***	695 x 580 x 250	520 x 635 x 110	305	1000/215	99.99%
PHAP-550x550 -A-SC1-***-*** ***_***_***_***_***	550 x 550 x 250	490 x 490 x 110	305	740/215	99.99%
PHAP-476x476 -A-SC1-***-*** ***_***_***_***_***	476 x 476 x 250	416 x 416 x 110	305	500/215	99.99%
PHAP-1090x695-A-SC2-***-*** ***_***_***_***_***	1090 x 695 x 250	1030 x 635 x 66	305	960/140	99.99%
PHAP-822x695 -A-SC2-***-*** ***_***_***_***_***	822 x 695 x 250	762 x 635 x 66	305	700/140	99.99%
PHAP-695x695 -A-SC2-***-*** ***_***_***_***_***	695 x 695 x 250	635 x 635 x 66	305	580/140	99.99%
PHAP-695x580 -A-SC2-***-*** ***_***_***_***_***	695 x 580 x 250	520 x 635 x 66	305	460/140	99.99%
PHAP-550x550 -A-SC2-***-*** ***_***_***_***_***	550 x 550 x 250	490 x 490 x 66	305	345/140	99.99%
PHAP-476x476 -A-SC2-***-*** ***_***_***_***_***	476 x 476 x 250	416 x 416 x 66	305	230/140	99.99%

Note: please refer to the next 2 tables of "Model number system" for model selection per detail options

Terminal Filter Housings

Pharmaseal AP

Model Number System - HEPA Supply Module

PHAP-	695 X 695-	A-	SC-	LS-	TS-	C12-	S	1	0	O-	N-	BG-	A-	P-	C
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Description								
1.	Product:	Pharmaseal AP HEPA supply module						
2.	Hood standard size (Length x Width) mm: (excl. trim) * if other sizes, please state	476 x 476	695 x 580	695 x 695	822 x 695	1090 x 695		
3.	Hood construction material:	A = Heavy duty extruded Aluminium (standard)	S = Stainless Steel 304# (optional)					
4.	Specification of filter element installed: In-site scanned local efficiency using PAO/DEHS @ designed filter face velocity	SC1 = ≥99.99% @ 0.97m/s	SC2 = ≥99.99% @ 0.45m/s	SC3 = Other specs. (please state separately)	O: No filter required (filter size is smaller than hood by 60mm)			
5.	Seal between hood and filter	LS = Liquid Seal, PU gel	LSS = Liquid Seal, Special (Silicon gel)	GS = Gasket Seal, endless PU				
6.	Inlet location:	TS = Top Side (standard)	LS = Length Side	WS = Width Side				
7.	Inlet style and size: Mould-drawn top Inlet collar and top plate of one-piece aluminium (standard): Rectangular inlet collar with 30mm wide flange (mm) * if other sizes, please specify	C12 = Round, Ø 12"=305mm R22 = 250 x 250	C14 = Round, Ø 14"=350mm R32 = 320 x 250	R33 = 320 x 320	R43 = 400 x 320	R44 = 400 x 400	Other sizes	
8.	Outlet diffuser material:	A = Aluminium	S = Stainless steel 304	C = Carbon steel				
9.	Diffuser style:	1 = center perforated and 4-way blades surrounded	2 = Fully perforated style	3 = Swirling	4 = Other style (specify separately)			
10.	Diffuser surface treatment:	1 = Powder coated (standard color RAL9016 or specify)	0 = No coating					
11.	Diffuser location:	I = Inside the hood (within)	O = Outside the hood (extended)					
12.	Diffuser fastener:	M = Magnets (for carbon steel diffuser only)	N = Acorn nuts (for alum and SS304 diffusers)					
13.	Damper:	BG = Butterfly damper, Galvanized steel	BS = Butterfly damper, Stainless steel 304	NO= No damper				
14.	Aerosol injection and dispersion:	A = Yes (air tight quick connect)	N = No					
15.	Upstream aerosol sampling:	P = Yes (air tight quick connect)	N = No					
16.	Filter clamp:	C = Camclamp (plastic)	N = Nuts and retention tabs, SS304					

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Terminal Filter Housings

Pharmaseal AP

Module Number System - AP Filter Element

PHF-	SC1-	LS-	635X635-	01/	22
1	2	3	4	5	6

Description						
1. Product:	Pharmaseal-AP filter element					
2. Filter specification: In-site scanned local efficiency using PAO/DEHS @ designed filter face velocity	SC1 = ≥99.99% @ 0.97m/s	SC2 = ≥99.99% @ 0.45m/s	SC3 = Other spec (state separately)			
3. Seal between filter and hood:	LS = Liquid Seal, PU gel	LSS = Liquid Seal, Special (Silicon gel)	GS = Gasket Seal, endless PU			
4. Filter standard size (Width x Height) mm:	416 x 416	635 x 520	635 x 635	762 x 635	1030 x 635	Other odd sizes required, please specify.
5. Seal groove location:	01 = Air outlet side (standard)	10 = Air inlet side				
6. Face guard:	22 = Both sides (standard)	02 = Air outlet side	20 = Air inlet side			

Camfil Farr Solutions

Air Filter Technology

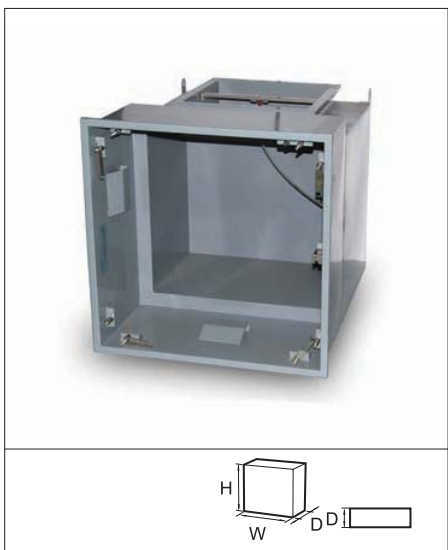
Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and speciality filters

Terminal Filter Housings

Pharmaseal Exhaust AP



Advantages

- Includes all essential functions for pharmaceutical and bio-cleanroom applications.
- In-situ efficiency 99.97% or higher is guaranteed.
- High capacity "V"-bank HEPA filter inside results in low pressure drop, low energy cost and long service life.
- Heavy duty aluminium or stainless steel fully welded to ensure the air-tight robust construction
- All ports of injection and samplings are of air tight quick-connection design.

Application: Exhaust/return air system for pharmaceutical and bio-cleanroom applications.
Type: Wall-mount, room side operatable, efficiency tested exhaust/return air housing with Sofilair filters.

Construction: Aluminium or stainless steel 304 fully welded, powder coated if required.

Filter seal: Endless PU gasket on filter.

Outlet connection: Flanged rectangular duct connection.

Damper: Room-side adjustable butterfly damper assembly, stainless steel #304 or galvanized steel material.

Room-side grill: Stainless steel 304, or aluminium or carbon steel painted.

Auxiliary test shroud: Movable room-side, functions for upstream aerosol injection and dispersion, upstream & downstream aerosol sampling.

Accessory: Downstream sampling kit along with every housing supplied.

Installation: Side wall mounted with site-made metal brackets (instructed but not supplied by Camfil Farr).

Model	Housing size (WxHxD) mm	Flanged outlet (mm)	Filter model	Rated air flow / initial pressure drop m ³ /h / Pa	In-situ Efficiency 0.3µm
PWAP-670x670-A-*-* ***_**_*	670 x 670 x 840	500 x 400	Sofilair 1560.02	4000/250	99.97%
PWAP-670x365-A-*-* ***_**_*	670 x 365 x 690	400 x 250	Sofilair 1565.01	1700/250	99.97%
PWAP-670x670-H-*-* ***_**_*	670 x 670 x 840	500 x 400	Sofilair 1560.02.06	3000/250	99.995%
PWAP-670x365-H-*-* ***_**_*	670 x 365 x 690	400 x 250	Sofilair 1565.01.02	1500/250	99.995%

Note: Tolerance of the pressure drop data within +/- 20% as standard. Please refer to next table "Model Number System" for model selection per detail options.

Model Number System - Wall Mount Exhaust HEPA Housing

PWAP-	670x670-	A-	A-	S-	R54-	S	1	0	O-	BS-	D-	P
1	2	3	4	5	6	7	8	9	10	11	12	13

Naming description	
1. Product:	Pharmaseal AP Wall Mount Exhaust/Return Air HEPA Housing
2. Housing standard 2 sizes: Width x Height (excl. trim) x Depth (mm)	670 x 670 x 840 (with Sofilair filter 610x610x292mm) 670 x 365 x 690 (with Sofilair filter 305x610x292mm)
3. Housing construction material:	A = Aluminium, powder coated S = Stainless Steel #304 X = Other metals, please state separately
4. Specification of filter element installed:	A = Sofilair Absolute, H13 (per EN 1822) H = Sofilair HEPA, H14 (per EN 1822) X = Other eff. grade, please state separately O = No filter required Note: for required in-site efficiency ≥ 99.99% by using "hot" generated PAO/DEHS, H14 shall be selected.
5. Outlet location:	S = Side outlet (for upwards or downwards), standard B = Back outlet

Terminal Filter Housings

Pharmaseal Exhaust AP

Naming description		
6. Outlet size : Rectangular outlet, fully welded with 30mm flange outwards		R54 = 500x400 mm R42 = 400x250 mm 0 = Other size, please state separately
7. Diffuser material:		S = Stainless steel #304 A = Aluminium C = Carbon steel O = Other material
8. Diffuser style:		1 = Fully perforated, standard 2 = Other style, please state separately
9. Diffuser surface coating:		0 = No treatment or coating 1 = Powder coated, RAL9016, for other color, please separately 2 = Passivated for SS304, or anodized for aluminium
10. Diffuser location:		O = Outside the housing (extended), standard I = Inside the housing (within)
11. Damper at outlet:		BS = Butterfly damper, stainless steel #304 BG = Butterfly damper, galvanized steel NO = No damper
12. Downstream aerosol sampling assembly:		D = Yes N = No
13. Pressure Drop test port:		P = Yes N = No

Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and speciality filters

Terminal Filter Housings

Sofdistri



Advantages

- Quick and easy installation of HEPA/ULPA filters
- Positive clamping mechanism
- Leak free construction
- Support points for connection to steelwork
- Light weight
- Flush mounted diffuser-easy to clean

Applications: Clean areas with supply and extract systems.

Type: Terminal housing for HEPA/ULPA filters.

Mounting: By integrated suspension eyes or rested in ceiling grid.

Construction: Anodized Aluminium frame, GI and ALU inlet cover.

Filter type: HEPA and ULPA.

Filter mounting: Quick filter change using pivoting clamps.

Connection: Connection from top, 305mm or 250mm collar.

Diffuser: GI, ALU, SS or Powder coated GI perforated sheet.

Housing

Reference	Type	Model	Exterior dimensions (WxHxD) mm	Collar size dia. mm	Unit weight kg	Unit volume m ³
4102002	Sofdistri (Top entry)	TFT/5/5/1 (A1)	594 x 594 x 175	250	9.7	0.11
4102003	Sofdistri (Top entry)	TFT/11/1(A1)	1194 x 594 x 175	250	16.3	0.22

* Other dimensions, finishes and different option are available.

Filter

Reference	Model	Filter dimension (WxHxD) mm	Filter Classification EN 1822:2009	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
15008782	MD13-514*514-10/22	514 x 514 x 66	H13	6.9	428/115	3.5	0.03
15042254	MD14-514*514-10/22	514 x 514 x 66	H14	6.9	428/142	3.5	0.03
15008783	MD13-1114*514-10/22	1114 x 514 x 66	H13	15	928/115	7	0.06
15042153	MD14-1114*514-10/22	1114 x 514 x 66	H14	15	928/141	7	0.06

* Gasket at filter inlet.

CamContain

Safety Can Never Be Overestimated

Especially when it comes to highly sensitive subjects such as the infection of humans and animals by highly contagious micro-organisms. The highest standards must be fulfilled, particularly when hazardous materials like infective micro-organisms or radioactive particles have to be filtered, for example in pharmaceutical, biotechnological, nuclear or BSL 3/ BSL 4 laboratories.

CamContain is developed to provide the highest level of safety.

CamContain housing with integrated automatic scanning system allows for validation tests to be conducted while the system is operational. Filters are tested "in-Situ" for overall efficiency and leaks. Validation data may be collected and recorded through a linked, PC-based software system, which will produce comparison data between previous validations and indicate areas of current and potential failure.

For applications with which dangerous microorganisms (BSL3/BSL4), the CamContain housing can be supplied with decontamination ports. Optional bag-in/bag-out filter exchange provides additional safety for the maintenance personnel.

The CamContain, with a full welded, pressure decay tested stainless steel filter housing, meets the most stringent global standards for filtration systems including requirements from the nuclear power industry.

- Integrated automatic filter scanning
- New filter clamping mechanism
- Innovative configurable design
- Safe decontamination concept



CamScan Mobile

The CamScan Mobile is a test unit which allows the automatic testing of installed filters. Both the total efficiency as well as any possible filter leakage can be measured, as per EN 1822. All the measured values are recorded, enabling easy documentation of data.



Camfil Farr Solutions

Air Filter Technology

Pre-filtration,
Class G3 to F5Bag and Compact Filters,
Class F5 to F9HEPA / ULPA Filters,
Class E10 to U17

Molecular Filtration

Frames, housings
and speciality filters

CamSafe



Advantages

- Contact free filter change
- Automatic tension regulating filter clamping device
- Fast secure filter installation, lever operated
- Optional filter seal seating test as per DIN 1946, Part 4
- Sealed, welded, solid design
- Tightness class B as per EN 1866 at 5000 Pa
- Ready flanged
- CamSafe connecting pieces can be supplied in various designs

Application: CamSafe housing are used when filtering radioactive, toxic or bacterial particles and gasses and provide maximum safety for the operator. Areas of use include laboratories, isolation wards and the pharmaceutical industry. The casings can be joined together so that multi-stage filter systems with a volume flow of up to 24,000 m³/h can be achieved.

Epoxy coated casing: Epoxy resin coating in RAL 9010 which is capable of being decontaminated, clamping device made from high grade steel 1.4301.

Steel casing: Manufactured in high grade steel 1.4301.

Standard design: Material thickness 2mm, flange drilled ready for operation, service cover with male thread hand knobs, changing bag, support shelf for contact free filter changing, automatic tension regulating filter clamping device.

Options: Filter seal seating test device in accordance with DIN 1946 Part 4, pressure compensation device and pressure check points.

Filter cartridges:

Prefilter P1: 610x610x47mm .

Prefilter P2: 610x610x292mm.

Main filter: 610x610x292mm.

All main filters come equipped with straps to aid the handling, enabling them to be changed easily. The filters can be supplied with a variety of gaskets to suit the application. The casing is suitable for different classes of filter, suitable for dealing with glasses or particle contamination.

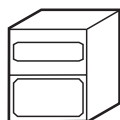
Accessories: Safe change bags, manometers and material for the flanged joints supplied on request.

Reference	Type	Dimensions (WxHxD*) mm	Dimensions prefilter (WxHxD) mm	Dimensions second filter (WxHxD) mm	Unit weight kg	Unit volume m ³
518010	Camsafe 1000, painted	730 x 535 x 725 (+ 90*)	-	610 x 610 x 292	50	0.35
518014	Camsafe P1/1000, painted	730 x 790 x 725 (+ 90*)	610 x 610 x 47	610 x 610 x 292	80	0.55
518018	Camsafe P2/1000, painted	730 x 1020 x 725 (+ 90*)	610 x 610 x 292	610 x 610 x 292	90	0.7
5180101	Camsafe 1000 1.4301	730 x 535 x 725 (+ 90*)	-	610 x 610 x 292	50	0.35
5180141	Camsafe P1/1000 1.4301	730 x 790 x 725 (+ 90*)	610 x 610 x 47	610 x 610 x 292	80	0.35
5180181	Camsafe P2/1000 1.4301	730 x 1020 x 725 (+ 90*)	610 x 610 x 292	610 x 610 x 292	90	0.7

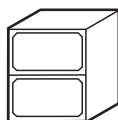
* incl. male thread hand knobs + 90mm. Allow access of approximately 1m to change the filter.



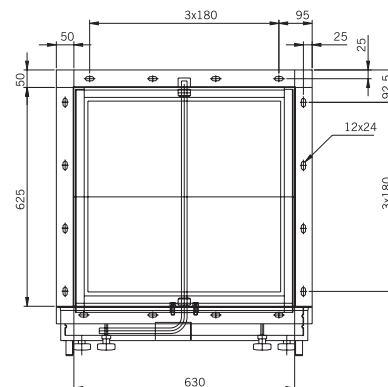
Camsafe 1000



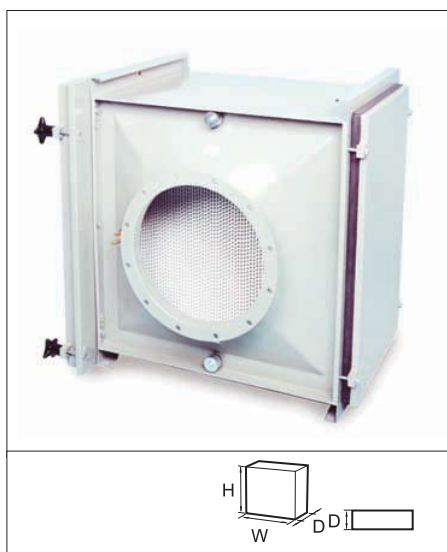
Camsafe P1 / 1000



Camsafe P2 / 1000



CamBox



Advantages

- Available for different types of filters and sizes
- Simple filter installation
- Available with safe change bag for contact-free filter change
- Available with screw or hinged inspection hatch
- Available in full or half-size module

Application: For the removal of hazardous dust and gas in laboratories, radiology departments and isolation wards.

Filter housings, painted: Epoxy resin coating, RAL 7037, clamping device made of stainless steel SS2333.

Filter housing stainless: Manufactured in AISI 304 stainless steel.

Filter housing stainless: Manufactured in AISI 316 corrosion-resistant stainless steel.

Standard: Connection for Ø315 mm or Ø200 mm flexible duct.

Optional: Ø 315 mm welded flange with connector for pressure drop measurement.

Door: Flat service cover.

Optional: Inspection hatch or special door for contamination-free change of changing bag.

Note: * Inspection hatch have separate article numbers.

Filter: Absolute or Micretain model 450 and 1000, filter class E11-H14 according to EN 1822. Also Airopac model 3CPM-122412 and 3CPM-242412, filter class F6, F8 according to EN779:2002.

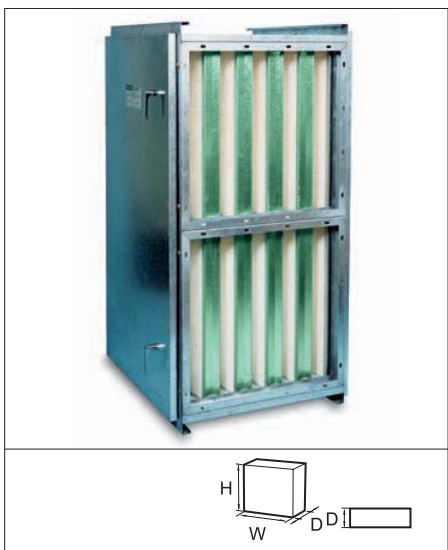
Reference	Type	Dimensions (WxHxD) mm
500974	Cambox 450, painted 200 mm duct	310 x 710 x 610
500922	Cambox 1000, painted/ 315 mm duct	615 x 710 x 610
500975	Cambox 450, painted/flanges	310 x 710 x 610
500928	Cambox 1000, painted/flanges	615 x 710 x 610
500923	Cambox 1000, stainless/duct	615 x 710 x 610
500929	Cambox 1000, stainless/flanges	615 x 710 x 610

Accessories / options:

500935	Inspection hatch/painted
500936	Inspection hatch/stainless
500941	Service door/painted
500942	Service door/stainless
500938	Safe change bag/painted
500939	Safe change bag/stainless
120005	Manometers
201411	Rubber ring for a safe change bag
201412	Safe change bag, standard, without the rubber ring
15016	Safe change bag Nuclear
27025	Swivel joint wrench 10/11

Filter Housing

FCBS-HF



Advantages

- Easy to Install
- Modular construction
- Gasket to seal between door and filter housing
- No tools needed to change filters
- Easy servicing
- Stable and secure design

Housing: Galvanised steel.

Filters: S-FLO-W, HI-CAP, Hi-FLO and OPAKFIL G.

Alternative: Possibility to switch the housings 180° (flexibility to access from left or right side).

Note: Stainless steel version is also available.

Reference	Type	Model	Exterior dimensions (WxHxD) mm	Interior dimensions (WxH) mm	Number of filters 592x592 mm	Number of filters 287x592 mm	Unit Volume m ³	Unit Weight kg
613002020	FCBS-HF 0510	05 10	399 × 744 × 500	309 × 614	-	1	0.15	18
613002040	FCBS-HF 1005	10 05	704 × 439 × 500	614 × 309	-	1	0.16	18
613002050	FCBS-HF 1010	10 10	704 × 744 × 500	614 × 614	1	-	0.27	24
613002060	FCBS-HF 1015	10 15	704 × 1055 × 500	614 × 925	1	1	0.38	38
613002070	FCBS-HF 1020	10 20	704 × 1360 × 500	614 × 1230	2	-	0.49	42
613002080	FCBS-HF 1025	10 25	704 × 1670 × 500	614 × 1540	2	1	0.6	54
613002090	FCBS-HF 1030	10 30	704 × 1975 × 500	614 × 1845	3	-	0.71	62
613002100	FCBS-HF 1510	15 10	1013 × 744 × 500	923 × 614	1	1	0.39	33
613002110	FCBS-HF 1520	15 20	1013 × 1360 × 500	923 × 1230	2	2	0.7	57
613002120	FCBS-HF 1530	15 30	1013 × 1975 × 500	923 × 1845	3	3	1.03	80
613002130	FCBS-HF 2010	20 10	1318 × 744 × 500	1228 × 614	2	-	0.5	38
613002140	FCBS-HF 2015	20 15	1318 × 1055 × 500	1228 × 925	2	2	0.71	62
613002150	FCBS-HF 2020	20 20	1318 × 1360 × 500	1228 × 1228	4	-	0.92	65
613002160	FCBS-HF 2025	20 25	1318 × 1670 × 500	1228 × 1540	4	2	1.13	86
613002170	FCBS-HF 2030	20 30	1318 × 1975 × 500	1228 × 1845	6	-	1.33	92
613002180	FCBS-HF 2510	25 10	1677 × 744 × 500	1537 × 614	2	-	0.64	47
613002190	FCBS-HF 2520	25 20	1677 × 1360 × 500	1537 × 1230	4	2	1.17	81
613002200	FCBS-HF 2530	25 30	1677 × 1975 × 500	1537 × 1845	6	3	1.7	114
613002210	FCBS-HF 3010	30 10	1982 × 744 × 500	1842 × 614	3	-	0.76	54
613002220	FCBS-HF 3015	30 15	1982 × 1055 × 500	1842 × 925	3	3	1.07	81
613002230	FCBS-HF 3020	30 20	1982 × 1360 × 500	1842 × 1230	6	-	1.38	89
613002240	FCBS-HF 3025	30 25	1982 × 1670 × 500	1842 × 1540	6	3	1.7	118
613002250	FCBS-HF 3030	30 30	1982 × 1975 × 500	1842 × 1842	9	-	2	126

Other dimensions and arrangements available on request

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Filter Housing

FCBS-A



Advantages

- Easy to Install
- Modular construction
- No tools needed to change filters
- Stable and secure design
- Easy servicing
- Gasket to seal between door and filter housing

Housing: Galvanised steel.

Filters: Absolute, AIROPAC, MICRETAIR and SOFILAIR.

Alternative: Possibility to switch the housings 180° (flexibility to access from left or right side).

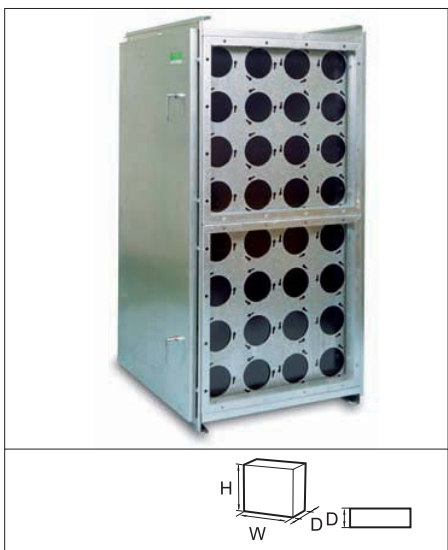
Note: Stainless steel version is also available.

Reference	Type	Model	Exterior dimensions (WxHxD) mm	Interior dimensions (WxH) mm	Number of filters 592x592 mm	Number of filters 287x592 mm	Unit Volume m³	Unit Weight kg
605003520	FCBS-A 0510	05 10	399 × 744 × 500	309 × 614	-	1	0.15	20
605003540	FCBS-A 1005	10 05	704 × 439 × 500	614 × 309	-	1	0.16	20
605003550	FCBS-A 1010	10 10	704 × 744 × 500	614 × 614	1	-	0.27	26
605003560	FCBS-A 1015	10 15	704 × 1055 × 500	614 × 925	1	1	0.38	41
605003570	FCBS-A 1020	10 20	704 × 1360 × 500	614 × 1230	2	-	0.49	46
605003580	FCBS-A 1025	10 25	704 × 1670 × 500	614 × 1540	2	-	0.6	59
605003590	FCBS-A 1030	10 30	704 × 1975 × 500	614 × 1845	3	-	0.71	68
605003600	FCBS-A 1510	15 10	1013 × 744 × 500	923 × 614	1	-	0.39	37
605003610	FCBS-A 1520	15 20	1013 × 1360 × 500	923 × 1230	2	2	0.7	62
605003620	FCBS-A 1530	15 30	1013 × 1975 × 500	923 × 1845	3	3	1.03	88
605003630	FCBS-A 2010	20 10	1318 × 744 × 500	1228 × 614	2	-	0.5	42
605003640	FCBS-A 2015	20 15	1318 × 1055 × 500	1228 × 925	2	2	0.71	68
605003650	FCBS-A 2020	20 20	1318 × 1360 × 500	1228 × 1228	4	-	0.92	72
605003660	FCBS-A 2025	20 25	1318 × 1670 × 500	1228 × 1540	4	2	1.13	95
605003670	FCBS-A 2030	20 30	1318 × 1975 × 500	1228 × 1845	6	-	1.33	101
605003680	FCBS-A 2510	25 10	1677 × 744 × 500	1537 × 614	2	1	0.64	51
605003690	FCBS-A 2520	25 20	1677 × 1360 × 500	1537 × 1230	4	2	1.17	89
605003700	FCBS-A 2530	25 30	1677 × 1975 × 500	1537 × 1845	6	3	1.7	126
605003710	FCBS-A 3010	30 10	1982 × 744 × 500	1842 × 614	3	-	0.76	59
605003720	FCBS-A 3015	30 15	1982 × 1055 × 500	1842 × 925	3	3	1.07	89
605003730	FCBS-A 3020	30 20	1982 × 1360 × 500	1842 × 1230	6	-	1.38	98
605003740	FCBS-A 3025	30 25	1982 × 1670 × 500	1842 × 1540	6	3	1.7	130
605003750	FCBS-A 3030	30 30	1982 × 1975 × 500	1842 × 1842	9	-	2	138

Other dimensions and arrangements available on request

Filter Housing

FCBL-CC



Advantages

- Easy to Install
- Modular construction
- No tools needed to change filters
- Stable and secure design
- Easy servicing
- Gasket to seal between door and filter housing

Housing: Galvanised steel.

Filters: Carbon cylinders 1000, 2000 or 2600.

Alternative: Possibility to switch the housings 180° (flexibility to access from left or right side).

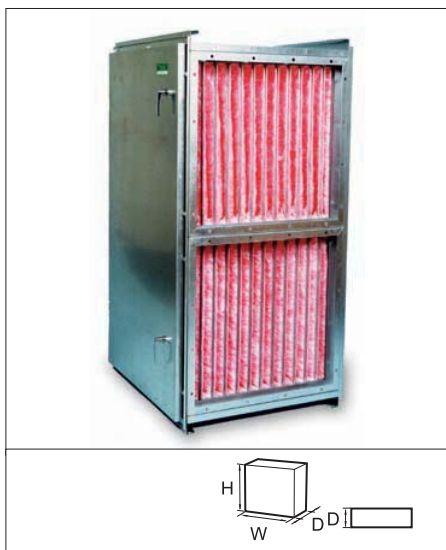
Note: Stainless steel version is also available

Reference	Type	Model	Exterior dimensions (WxHxD) mm	Interior dimensions (WxH) mm	Number of cylinders	Unit Volume m ³	Unit Weight kg
607002020	FCBL-CC 0510	05 10	399 × 744 × 750	309 × 610	8	0.23	25.5
607002040	FCBL-CC 1005	10 05	704 × 439 × 750	614 × 309	8	0.24	25.5
607002050	FCBL-CC 1010	10 10	704 × 744 × 750	614 × 614	16	0.4	33
607002060	FCBL-CC 1015	10 15	704 × 1055 × 750	614 × 925	24	0.57	49.5
607002070	FCBL-CC 1020	10 20	704 × 1360 × 750	614 × 1230	32	0.73	58.5
607002080	FCBL-CC 1025	10 25	704 × 1670 × 750	614 × 1540	40	0.9	75
607002090	FCBL-CC 1030	10 30	704 × 1975 × 750	614 × 1845	48	1.06	82.5
607002100	FCBL-CC 1510	15 10	1013 × 744 × 750	923 × 614	24	0.58	45
607002110	FCBL-CC 1520	15 20	1013 × 1360 × 750	923 × 1230	48	1.05	75
607002120	FCBL-CC 1530	15 30	1013 × 1975 × 750	923 × 1845	72	1.53	110
607002130	FCBL-CC 2010	20 10	1318 × 744 × 750	1228 × 614	32	0.75	53
607002140	FCBL-CC 2015	20 15	1318 × 1055 × 750	1228 × 925	48	1.06	80.5
607002150	FCBL-CC 2020	20 20	1318 × 1360 × 750	1228 × 1228	64	1.37	91.5
607002160	FCBL-CC 2025	20 25	1318 × 1670 × 750	1228 × 1540	80	1.68	118
607002170	FCBL-CC 2030	20 30	1318 × 1975 × 750	1228 × 1845	96	1.99	128.5
607002180	FCBL-CC 2510	25 10	1677 × 744 × 750	1537 × 614	40	0.95	65
607002190	FCBL-CC 2520	25 20	1677 × 1360 × 750	1537 × 1230	80	1.74	111
607002200	FCBL-CC 2530	25 30	1677 × 1975 × 750	1537 × 1845	120	2.53	157.5
607002210	FCBL-CC 3010	30 10	1982 × 744 × 750	1842 × 614	48	1.13	72.5
607002220	FCBL-CC 3015	30 15	1982 × 1055 × 750	1842 × 925	72	1.6	111
607002230	FCBL-CC 3020	30 20	1982 × 1360 × 750	1842 × 1230	96	2.06	124.5
607002240	FCBL-CC 3025	30 25	1982 × 1670 × 750	1842 × 1540	120	2.53	161.5
607002250	FCBL-CC 3030	30 30	1982 × 1975 × 750	1842 × 1842	144	2.99	175

Other dimensions and arrangements available on request

Filter Housing

FCBL-HF



Advantages

- Easy to Install
- Modular construction
- No tools needed to change filters
- Stable and secure design
- Easy servicing
- Gasket to seal between door and filter housing

Housing: Galvanised steel.

Filter: S-FLO, HI-FLO and HI-CAP.

Alternative: Possibility to switch the housings 180° (flexibility to access from left or right side).

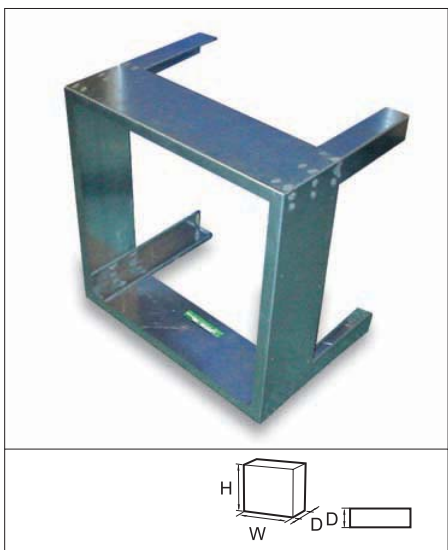
Note: Stainless steel version is also available.

Reference	Type	Model	Exterior dimensions (WxHxD) mm	Interior dimensions (WxH) mm	Number of filters 592x592 mm	Number of filters 287x592 mm	Unit Weight kg	Unit Volume m³
613003020	FCBL-HF 0510	05 10	399 x 744 x 750	309 x 614	-	1	25	0.23
613003040	FCBL-HF 1005	10 05	704 x 439 x 750	614 x 309	-	1	25	0.24
613003050	FCBL-HF 1010	10 10	704 x 744 x 750	614 x 614	1	-	32.5	0.4
613003060	FCBL-HF 1015	10 15	704 x 1055 x 750	614 x 925	1	1	51.5	0.57
613003070	FCBL-HF 1020	10 20	704 x 1360 x 750	614 x 1230	2	-	57.5	0.73
613003080	FCBL-HF 1025	10 25	704 x 1670 x 750	614 x 1540	2	1	73.5	0.9
613003090	FCBL-HF 1030	10 30	704 x 1975 x 750	614 x 1845	3	-	85	1.06
613003100	FCBL-HF 1510	15 10	1013 x 744 x 750	923 x 614	1	1	45	0.58
613003110	FCBL-HF 1520	15 20	1013 x 1360 x 750	923 x 1230	2	2	77.5	1.05
613003120	FCBL-HF 1530	15 30	1013 x 1975 x 750	923 x 1845	3	3	110	1.53
613003130	FCBL-HF 2010	20 10	1318 x 744 x 750	1228 x 614	2	-	51.5	0.75
613003140	FCBL-HF 2015	20 15	1318 x 1055 x 750	1228 x 925	2	2	84	1.06
613003150	FCBL-HF 2020	20 20	1318 x 1360 x 750	1228 x 1228	4	-	89	1.37
613003160	FCBL-HF 2025	20 25	1318 x 1670 x 750	1228 x 1540	4	2	117.5	1.68
613003170	FCBL-HF 2030	20 30	1318 x 1975 x 750	1228 x 1845	6	-	126	1.99
613003180	FCBL-HF 2510	25 10	1677 x 744 x 750	1537 x 614	2	1	64	0.95
613003190	FCBL-HF 2520	25 20	1677 x 1360 x 750	1537 x 1230	4	2	110	1.74
613003200	FCBL-HF 2530	25 30	1677 x 1975 x 750	1537 x 1845	6	3	156	2.53
613003210	FCBL-HF 3010	30 10	1982 x 744 x 750	1842 x 614	3	-	73.5	1.13
613003220	FCBL-HF 3015	30 15	1982 x 1055 x 750	1842 x 925	3	3	111	1.6
613003230	FCBL-HF 3020	30 20	1982 x 1360 x 750	1842 x 1230	6	-	121.5	2.06
613003240	FCBL-HF 3025	30 25	1982 x 1670 x 750	1842 x 1540	6	3	162	2.53
613003250	FCBL-HF 3030	30 30	1982 x 1975 x 750	1842 x 1842	9	-	172	2.99

Other dimensions and arrangements available on request.

Filter Holding Frames

Absolute Filter Holding Frame



Advantages

- Modular design adaptable for all types of installations
- Location dimples in frame ensure correct filter fitting
- Pre drilled for easy assembly
- Filter holding clips can be easily replaced as required

Application: Mounting very high efficiency filters in air conditioning units and systems.

Type: Front access filter holding frame.

Construction: Galvanised steel or stainless steel.

Filter Types: Absolute and Micretain very high efficiency filters.

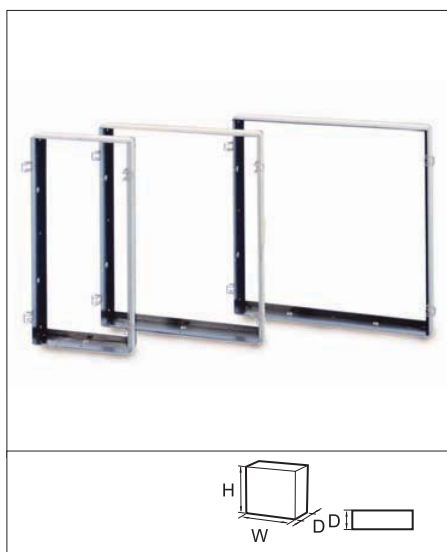
Filter fixing: Using 4 corner mounted clips.

Reference	Type	Exterior dimensions (WxHxD) mm	Filter dimensions (WxHxD) mm	Unit Weight kg	Unit Volume m ³
5107.06.01	Galvanised steel	626 x 626 x 335	610 x 610 x 292	12.5	0.13
5107.24.01	Galvanised steel	626 x 321 x 335	610 x 305 x 292	10.0	0.07
5107.60.01	Galvanised steel	610 x 610 x 335	595 x 595 x 292	12.3	0.12
5107.50.01	Galvanised steel	610 x 305 x 335	595 x 290 x 292	9.9	0.06
5107.06.02	Stainless steel	626 x 626 x 335	610 x 610 x 292	12.5	0.13
5107.24.02	Stainless steel	626 x 321 x 335	610 x 305 x 292	10.0	0.07
5107.60.02	Stainless steel	610 x 610 x 335	595 x 595 x 292	12.3	0.12
5107.50.02	Stainless steel	610 x 305 x 335	595 x 290 x 292	9.9	0.06

Other dimensions and arrangements available on request.

Filter Holding Frames

Filter Holding Frame



Advantages

- Robust rigid construction
- Filter holding clips can be easily replaced as required
- Modular design adaptable for all types of installations
- Pre drilled for easy assembly
- Location dimples in frame ensure correct filter fitting

Application: Mounting air filters in air conditioning systems.

Type: Front access filter holding frame.

Construction: Galvanised steel.

Gasket: Type 4: endless PU; Type 8: PU foam.

Filter types: Pre-filters and header frame type filters.

Filter fixing: Using 4 corner mounted clips, to suit the installed filter.

Note: Remember to order the frame and the appropriate clips.

Frame

Reference	Type	Exterior dimensions (WxH) mm	Clips included	Unit Weight kg	Unit Volume m ³
430001	Frame 4SPXM	608 x 608 x 76	Yes	3	0.028
430003	Frame 4URZO	303 x 608 x 76	Yes	2.2	0.014
430F-4300104	Type 8 Holding Frame 24x12"	303 x 608 x 68	No	2.2	0.014
430F-4300101	Type 8 Holding Frame 24x24"	608 x 608 x 68	No	3	0.028

* Stainless steel is available on request.

Clips

Reference	Type	Model	Exterior dimensions (WxH) mm	Clips included	Unit Weight kg	Unit Volume m ³
6999-10001	Clip	C70	-	-	-	-
6999-10002	Clip	C78-3	-	-	-	-
6999-10003	Clip	C78-4	-	-	-	-
6999-10004	Clip	C78-5	-	-	-	-

Recommended Clips for Type 8 Frame

Prefilter	Secondary filter	Recommended clip	Number of clips required
1"	None	C70	4
2"	None	C70	4
4"	None	C78-4	4
None	With 25 or 20mm header	C70	4
1"	With 25 or 20mm header	C70	4
2"	With 25 or 20mm header	C78-3	4
4"	With 25 or 20mm header	C78-5	4



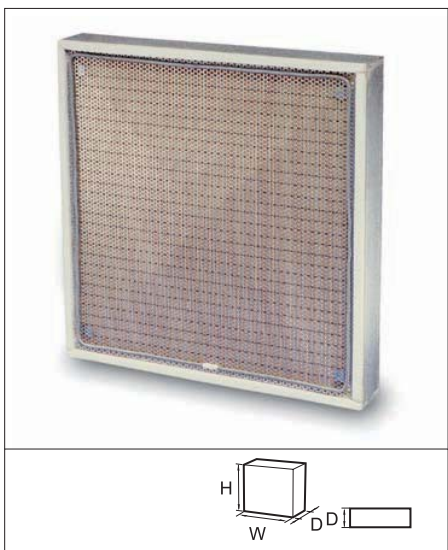
C- 78 SERIES



C-70

Filters for High Temperature

Termikfil 2000



Advantages

- Meets FDA requirements
- Exclusive precuring process at 300°C carried out in the plant
- Maximum continuous operating temperature 350°C, efficiency 99.99% at 0.3 μm
- Efficiency tested after precuring
- Ceramic frame

Application: Protection of ultra-clean processes at high temperature, sterilisation tunnels in the pharmaceutical industry.

Type: Very high efficiency panel resistant to 350°C in continuous service.

Frame: Composite ceramic.

Gasket: Rolled glass fibre paper + 6mm dia glass braid.

Media: Glass fibre.

Separator: Glass strands.

Sealant: Ceramic.

Faceguard: Upstream and downstream in stainless steel.

DOP efficiency: $\geq 99.99\%$.

Maximum local penetration: 0.01% conforming to FDA requirements.

Recommended final pressure drop: 350 Pa.

Temperature: Up to 350°C in continuous service.

Test: 100% after thermal treatment at 300°C.

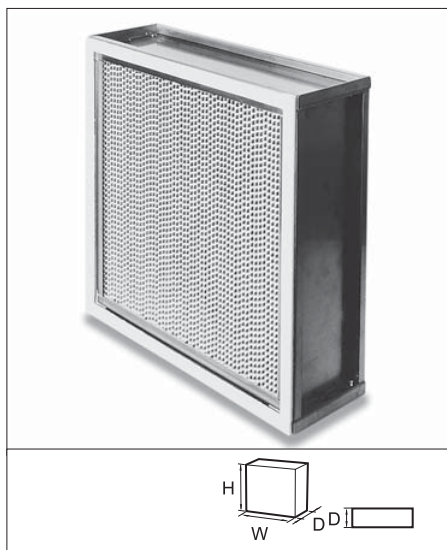
Mounting: A stainless steel adaptor frame can be supplied to reach the thickness of 150mm or 292mm.

NB: To reduce fume emission when starting up, TERMIKFIL undergoes a specific precuring cycle in the factory at 300°C using an exclusive CAMFIL FARR process.

Reference	Type	Model	Dimensions (WxHxD) mm	Efficiency at 0.30 μm %	Media area m^2	Airflow / pressure drop $\text{m}^3 / \text{hr} / \text{Pa}$	Unit Weight kg	Unit Volume m^3
3415.07.00	TERMIKFIL	4P4	457 x 457 x 84	99.9	5.0	675/250	3	0.04
3415.06.00	TERMIKFIL	3P3	305 x 305 x 84	99.9	2.9	300/250	2	0.01
3415.01.00	TERMIKFIL	3P6	305 x 610 x 84	99.9	5.9	600/250	4	0.02
3415.02.00	TERMIKFIL	6P6	610 x 610 x 84	99.9	12.1	1200/250	5	0.04
3415.05.00	TERMIKFIL	4P6	457 x 610 x 84	99.9	8.9	900/250	4	0.03
3415.03.00	TERMIKFIL	7P6	762 x 610 x 84	99.9	15.3	1500/250	6	0.05
3415.04.00	TERMIKFIL	9P6	915 x 610 x 84	99.9	18.5	1800/250	8	0.06

Filters for High Temperature

Absolute® 1FRK



Advantages

- 99.97% DOP
- High temperature resistant (up to 350°C)

Application: Protection of ultra-clean processes at high temperatures.

Frame: Stainless steel.

Gasket: Glass fibre.

Media: Glass fibre paper.

Separator: Aluminium.

Sealant: Ceramic, glass fibre.

DOP efficiency: 99.97% .

Temperature: 350°C in continuous service (400°C peak).

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN 1822:2009	Media area m ²	Airflow / nominal pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
162601AB	1FRK- 220-1W	305 x 610 x 150	H13	5.10	580/250	6.00	0.037
162601HB	1FRK- 300-1W	457 x 457 x 150	H13	5.90	620/250	8.00	0.050
162602MB	1FRK- 350-1W	457 x 610 x 150	H13	8.50	850/250	10.00	0.070
162604AB	1FRK- 600-1W	610 x 610 x 150	H13	11.40	1180/250	12.00	0.070
162608AB	1FRK- 980-1W	915 x 610 x 150	H13	17.10	1780/250	16.00	0.110
162601WB	1FRK- 450-1W	305 x 610 x 292	H13	10.40	900/250	9.00	0.060
162606PB	1FRK- 725-1W	610 x 457 x 292	H13	16.30	1420/250	13.00	0.080
162608HB	1FRK-1000-1W	610 x 610 x 292	H13	22.50	1960/250	17.00	0.120
162609AB	1FRK-1250-1W	762 x 610 x 292	H13	28.40	2480/250	21.00	0.170

Type -1W = Gasket on inlet side.

Type -01W = Gasket on outlet side.

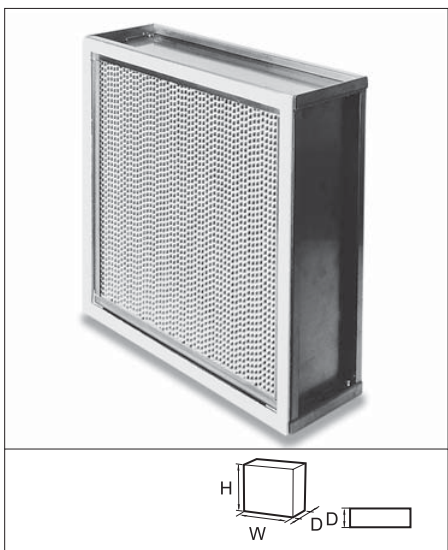
Type -2W = Gasket on both side.

Type -0 = No gasket.

* Other dimensions available on request.

Filters for High Temperature

Absolute® 1FRSI



Advantages

- 99.97% DOP
- High temperature resistant (up to 250°C)

Application: Protection of ultra-clean processes at high-temperatures.

Frame: Stainless steel.

Gasket: High temperature silicone.

Media: Glass fibre.

Separator: Aluminium.

Sealant: High temperature silicon.

DOP efficiency: 99.97%.

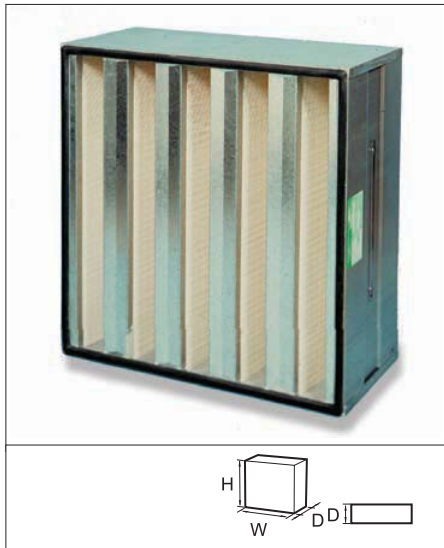
Temperature: ≤250°C.

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN 1822:2009	Media area m²	Airflow / pressure drop m³ / hr / Pa	Unit Weight kg	Unit Volume m³
162610GBC	1FRSI-25-1SIHT	203 x 203 x 78	H13	0.5	50/250	1.3	0.01
162610LBC	1FRSI-50-1SIHT	203 x 203 x 150	H13	0.9	90/250	2.5	0.01
162610QBC	1FRSI-110-1SIHT	305 x 305 x 150	H13	2.4	250/250	3.8	0.02
162610WBC	1FRSI-200-1SIHT	305 x 305 x 292	H13	5.1	410/250	7.5	0.03
162611HBC	1FRSI-300-1SIHT	457 x 457 x 150	H13	5.9	620/250	5.8	0.03
162611WBC	1FRSI-450-1SIHT	305 x 610 x 292	H13	10.4	900/250	10	0.03
162614ABC	1FRSI-600-1SIHT	610 x 610 x 150	H13	10.9	1180/250	7.5	0.06
162616PBC	1FRSI-725-1SIHT	457 x 610 x 292	H13	16.3	1420/250	13	0.05
162617HBC	1FRSI-830-1SIHT	762 x 610 x 150	H13	13.7	1500/250	9	0.07
162618ABC	1FRSI-980-1SIHT	915 x 610 x 150	H13	16.8	1800/250	11	0.08
162618HBC	1FRSI-1000-1SIHT	610 x 610 x 292	H13	22.5	1960/250	15	0.11
162619ABC	1FRSI-1250-1SIHT	762 x 610 x 292	H13	28.4	2500/250	16	0.14
162612ABC	1FRSI-457x457x292-1SIHT	457 x 457 x 292	H13	12.8	1030/250	11	0.06
162615ABC	1FRSI-610x457x150-1SIHT	610 x 457 x 150	H13	8.2	860/250	6.5	0.05
162616ABC	1FRSI-610x762x292-1SIHT	610 x 762 x 292	H13	28.2	2500/250	16	0.14

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Filters for High Temperature

Sofilair HT 120 - H13



Advantages

- High air flow rates
- Withstand high temperature up to 120°C
- Large media area
- High filter surface area offers low pressure drop for energy savings and longer life

Applications: Industry and hospitals.

Type: HEPA filter with high airflow.

Frame: Galvanized steel with handle.

Media: Glassfiber paper.

Separator: Glassfiber threads.

Sealant: Polyurethane.

Gasket: Half-round neoprene Ø 15 mm moulded in one piece, ≥99.95% MPPS (H13 according to EN 1822), ≥ 99.99 % 0.3μ

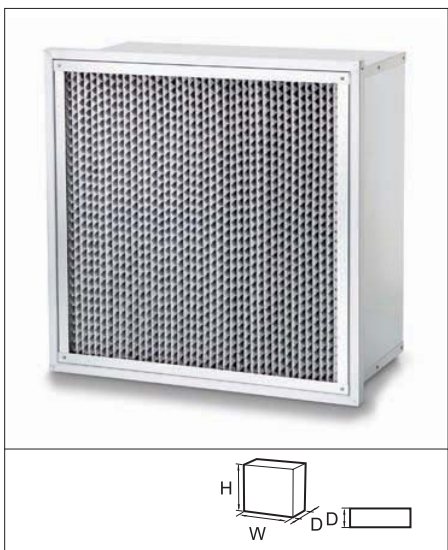
Temperature: 120°C maximum continuous.

Mounting systems: FCBL-A housing.

Reference	Model	Dimensions (WxHxD) mm	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
1561.02.00	SFR120-E-4000-H13	610 x 610 x 292	40	4000/250	23	0.11
1561.01.00	SFR120-E-3400-H13	610 x 610 x 292	33	3400/250	20	0.11
1564.01.00	SFR120-E-2500-H13	610 x 610 x 292	24	2500/25	19	0.11
1566.01.00	SFR120-E-1500-H13	305 x 610 x 292	16	1500/250	13	0.06
1567.01.50	SFR120-E-3200-H13	595 x 595 x 292	38	3200/250	22	0.11
1568.01.50	SFR120-E-1300-H13	289 x 595 x 292	16	1300/250	12	0.06

Filters for Painting Booths

Airopac® HT-HF



Advantages

- High efficiency
- 260°C/385°C max operating temperature
- Silicon free construction
- Compact design

Application: Paint bake ovens and other high temperature applications.

Type: High efficiency, high temperature, silicon free compact filter.

Frame: Galvanised steel.

Gasket: Glass fibre.

Media: Glass fibre paper.

Separator: Corrugated aluminium.

Sealant: Glass fibre.

Grille: Galvanised steel upstream and downstream.

EN 779:2002 filter class: F6, F8.

ASHRAE 52.2:2007 filter class: MERV 11, MERV 14.

Recommended final pressure drop: Filter depth: 78mm = 250Pa; 150mm & 292mm = 300Pa

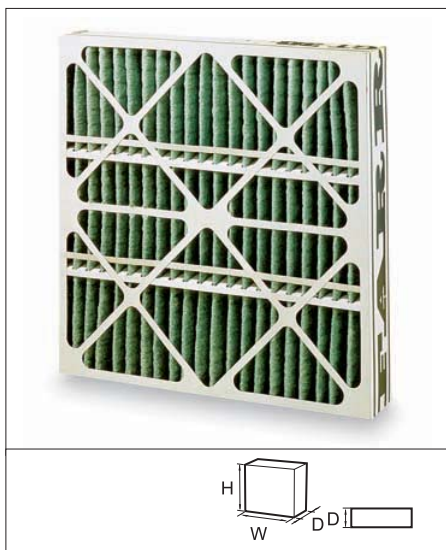
Temperature/Humidity: max. 400°C/100% r.F.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Media surface m ²	Airflow / nominal pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2180001	3CPM-HT-122412-60	305 x 610 x 292	F6	7.7	1700/80	5.6	0.062
2180002	3CPM-HT-242412-60	610 x 610 x 292	F6	15.9	3400/75	9.5	0.124
2180004	3CPM-HT-242406-60	610 x 610 x 150	F6	7.8	1700/30	5.6	0.124
2180005	3CPM-HT-122403-60	305 x 610 x 78	F6	2.4	750/30	2	0.02
2180006	3CPM-HT-242403-60	610 x 610 x 78	F6	4.9	1500/30	4	0.039
2181001	3CPM-HT-122412-90	305 x 610 x 292	F8	7.7	1700/120	5.6	0.062
2181002	3CPM-HT-242412-90	610 x 610 x 292	F8	15.9	3400/110	9.5	0.124
2181004	3CPM-HT-242406-90	610 x 610 x 150	F8	7.8	1700/65	5.6	0.072
2181005	3CPM-HT-122403-90	305 x 610 x 78	F8	2.4	750/80	2	0.02
2181006	3CPM-HT-242403-90	610 x 610 x 78	F8	4.9	1500/80	4	0.039
2181007	3CPM-HT-305*610*52-90	305 x 610 x 52	F8	2.7	750/90	1.8	0.015
2181008	3CPM-HT-610*610*52-90	610 x 610 x 52	F8	5.4	1500/90	3.6	0.035
2181009	3CPM-HT-480*480*78-90	480 x 480 x 78	F8	2.3	800/80	2.1	0.023
2181010	3CPM-HT-915*457*78-90	915 x 457 x 78	F8	5.7	2000/100	4.5	0.04
2181011	3CPM-HT-762*457*78-90	762 x 457 x 78	F8	3.6	1250/80	3.8	0.04
2190001	3CPM-HT-HF-242412-60	592 x 592 x 292	F6	13.3	3000/105	8.3	0.124
2191001	3CPM-HT-HF-242412-90	592 x 592 x 292	F8	13.3	3000/150	8.3	0.124

As part of our continuous improvement, Camfil Farr reserve the right to change specifications without notice.

Filters for Gas Turbines

30/30 GT



Advantages

- Low initial pressure drop
- Low resistance to airflow over the service life of the filter
- High dust holding capacity
- Incinerable

Application: Prefilter to extend the service life of final filters.

Type: High performance disposable pleated panel filter.

Frame: High strength beverage board with diagonal supports.

Media: Blended cotton & polyester.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 8.

Fire rating: UL 900.

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Volume m ³
540F-FG070205001	30/30 GT CL2 24x24x4	594 x 594 x 95	G4	2.5	3400/68	0.03
* 540F-FG402312001	30/30 GT CL2 24x24x4	594 x 594 x 95	G4	2.5	3400/68	0.03

* With gasket.

30/30® WR



Advantages

- 2-in-1 performance - keeps out water and dirt.
- Large media surface
- A multi-layered noncellulose media, repels water, captures dust, lint, pollen and other particulate contaminants.
- Media bonded to the frame to eliminate air bypass
- Water resistant beverage board frame

Applications: Primary filter for medium efficiency applications.

Type: High performance pleated panel filter.

Frame: High strength moisture resistant beverage board.

Media: Glass fibre.

EN 779:2002 filter class: G4.

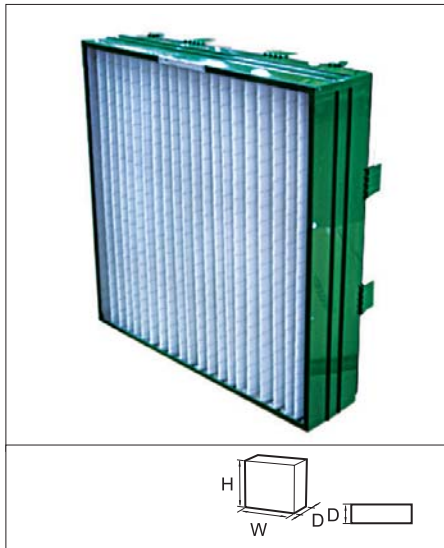
ASHRAE 52.2:2007 filter class: MERV 7.

Recommended final pressure drop: 250 Pa.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Volume m ³
125343005	30/30 WR 24x24x2	595 x 595 x 44	G4	2.61	3400/63	0.02
125343006	30/30 WR 24x12x2	289 x 595 x 44	G4	1.27	1700/63	0.01
402137001	30/30 WR 24x24x4	595 x 595 x 95	G4	4.24	3400/55	0.03
402137002	30/30 WR 24x12x4	289 x 595 x 95	G4	4.24	1700/55	0.02

CamClose



Advantages

- Low initial pressure drop
- High dust holding capacity
- Easy installation
- Clips onto CamGT or Turbopac
- Low resistance to airflow over the service life of the filter
- Incinerable

Application: Snap-on prefilter designed for use with Cam-GT and Opakfil GT(A) or Turbopac.

Frame: ABS.

Gasket: PU Foam.

Media: White synthetic media with downstream pleat separators are used to ensure optimum operation.

EN779:2002 filter class: G4.

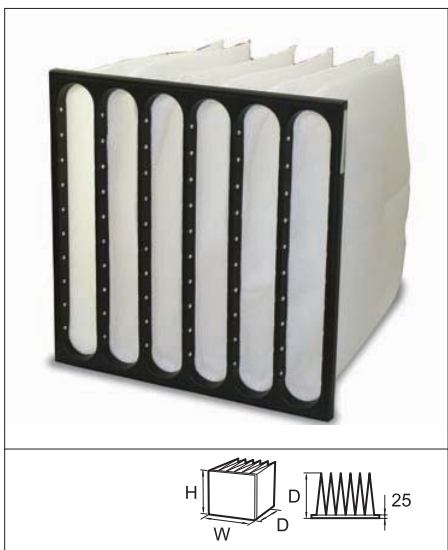
ASHRAE 52.2:2007 filter class: MERV 7.

Recommended final pressure drop: 400 Pa.

Fire rating: DIN 53438.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Airflow / pressure drop m ³ / hr / Pa	Dust holding capacity	Media area m ²	Unit Weight kg	Unit Volume m ³
540F-FG402312002	CamClose GT 24245-G4	588 x 588 x 129	G4	4250/77	780g	2.46	2.3	0.06

Hi-Cap® Green HF 90/35



Advantages

- Rigid self supporting pockets
- Robust plastic header frame
- High mechanical strength
- Welded pocket construction
- High dust holding capacity
- No metal parts

Application: Comfort air conditioning applications, gas turbines.

Type: Multi pocket bag filter.

Header frame: Plastic.

Media: Polyester fibre.

EN 779:2002 filter class: G4.

ASHRAE 52.2:2007 filter class: MERV 7.

Recommended final pressure drop: 250 Pa.

Temperature: 70°C maximum in continuous service.

Holding frames: Front and side access housings and frames are available, Type 8 and FC Housings.

Reference	Model	Dimensions (WxHxD) mm	Filter Classification EN 779:2002	Number of pockets	Media Area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
3204001	HF Green 90/35-66	592 x 592 x 360	G4	6	2.6	3400/50	2.2	0.04
3204003	HF Green 90/35-36	287 x 592 x 360	G4	3	1.3	1700/50	1.4	0.02

Filters for Gas Turbines

Cam-Flo XMGT



Advantages

- Improved synthetic media
- New design for better air distribution
- High dust holding capacity
- High mechanical strength

Application: For high humidity areas.

Type: Synthetic pre-filter.

Frame: Galvanized steel.

Media: Polypropylene and polyester.

EN 779:2002 filter class: F6, F7, F9.

ASHRAE 52.2:2007 filter class: MERV 12,13,15.

Recommended final pressure drop: 450 Pa.

Temperature: 70°C max. operating temperature .

Model	Dimensions (WxHxD) mm	Filter classification EN779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa
Cam-Flo XMGT-F6	592 x 592 x 640	F6	7.5	4250/85
Cam-Flo XMGT-F7	592 x 592 x 640	F7	7.5	4250/121
Cam-Flo XMGT-F9	592 x 592 x 640	F9	7.5	4250/167

Filters for Gas Turbines

Cam GT®



Advantages

- Can be used to upgrade existing installations
- Patented integrated water drainage
- Max burst pressure 7500 Pa
- Very robust construction
- Suitable for high humidity conditions
- Corrosion resistant

Application: Air intake for gas turbines, compressors and large engines.

Type: High efficiency, incinerable compact filter.

Frame: ABS.

Gasket: Endless polyurethane placed on the downstream side (code 01).

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Grid: Glass fibre reinforcement grid placed downstream.

EN 779:2002 filter class: F7, F8, F9.

EN 1822:2009 filter class: E10.

ASHRAE 52.2:2007 filter class: MERV 13, MERV 14, MERV 15, MERV 16.

Recommended final pressure drop: 600 Pa.

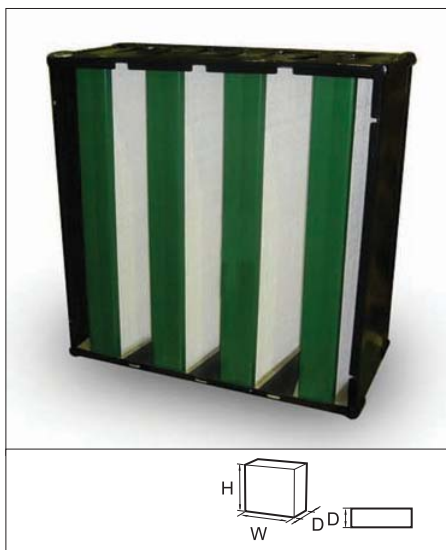
Temperature: 80°C maximum in continuous service.

N.B: Burst pressure: ≥ 7500 Pa.

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2460001	CAM GT-242412-F7-01	592 x 592 x 290	F7	19	4250/120	7	0.11
2460002	CAM GT-241212-F7-01	592 x 287 x 290	F7	9	2125/145	5	0.05
2461002	CAM GT-242412-F8-01	592 x 592 x 290	F8	19	4250/140	7	0.11
2461003	CAM GT-241212-F8-01	592 x 287 x 290	F8	9	2125/170	5	0.05
2460003	CAM GT-242412-F9-01	592 x 592 x 290	F9	19	4250/165	7	0.11
2460004	CAM GT-241212-F9-01	592 x 287 x 290	F9	9	2125/180	5	0.05
2460005	CAM GT-242412-E10-01	592 x 592 x 290	E10	19	4250/230	7	0.11
2460006	CAM GT-241212-E10-01	592 x 287 x 290	E10	9	2125/250	5	0.05

Filters for Gas Turbines

Cam GT® Box Type



Advantages

- Suitable for high humidity conditions
- Can be used to upgrade existing installations
- Patented integrated water drainage
- Very robust construction
- Burst pressure = 7500 Pa
- Corrosion resistant

Application: Air intake for gas turbines, compressors and large engines.

Type: High efficiency, incinerable compact filter.

Frame: High Impact PS and ABS.

Gasket: Endless polyurethane placed on the upstream side.

Media: Glass fibre paper.

Separator: Hot-melt beads.

Sealant: Polyurethane.

Grid: Glass fibre reinforcement grid placed downstream.

EN 779:2002 filter class: F7, F9.

EN 1822:2009 filter class: E10.

ASHRAE 52.2:2007 filter class: MERV 13, MERV 15, MERV 16.

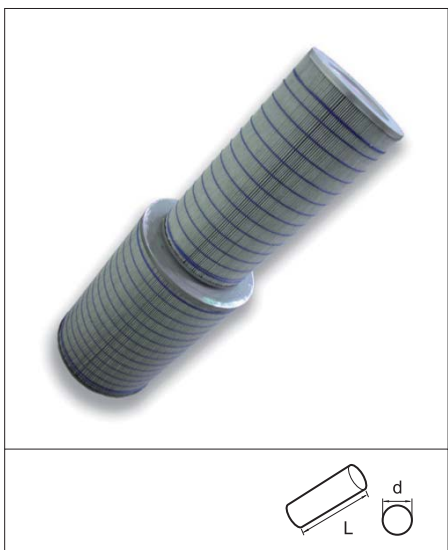
Recommended final pressure drop: 600 Pa.

Temperature: 80°C maximum in continuous service.

N.B: Burst pressure: ≥ 7500 Pa.

Reference	Model	Dimensions (WxHxD) mm	Filter classification EN779:2002	Media area m ²	Airflow / pressure drop m ³ / hr / Pa	Unit Weight kg	Unit Volume m ³
2470001	CAM GT Box Green 595*595*292-F7	595 x 595 x 290	F7	19	4250/140	7	0.11
2470004	CAM GT Box Green 595*595*292-F9	595 x 595 x 290	F9	19	4250/200	7	0.11
2470007	CAM GT Box Green 595*595*292-E10	595 x 595 x 290	E10	19	4250/240	7	0.11

CamPulse GT HemiPleat



Advantages

- High efficiency $\geq 99.999\%$ at 0.5μ and above
- Low pressure drop
- Reduced energy cost
- Open pleat spacing to enhance cleaning cycle
- Long filter life
- Double seal gasket for added security

Application: HemiPleat cartridges can be used on any gas turbines to improve performance.

Type: Pleated media cartridge with improved pleat spacing and media alignment.

Media: Polytech HE, ultra high efficiency proprietary blended media with hot melt blown surface laminate, Polytech standard proprietary blended cellulosic and polyester fibres with a moisture resistant silicone treatment.

Efficiency: 99.999% at 0.5μ and above.

Reference	Type	Media Type	Dimensions (dia. x L) mm	Media area m ²	Unit Weight kg
211497-001	HemiPleat	PolyTech Standard	380 x 1000	30.2	13.6
211497-005	HemiPleat	Poly Tech Ultra High Efficiency	380 x 1000	30.2	13.6
211497-006	HemiPleat	Poly Tech Ultra High Efficiency Fire Retardant	380 x 1000	30.2	13.6

Tenkey Hemipleat



Advantages

- High filtration efficiency
- Continuous one-piece gasket
- Long life
- Factory bonded steel top and bottom headers
- Excellent energy performance
- Pleated media
- Helical cord retainer

Application: HemiPleat cartridges can be used on any gas turbines to improve its performance.

Type: Pleated media cartridge with improved pleat spacing and media alignment.

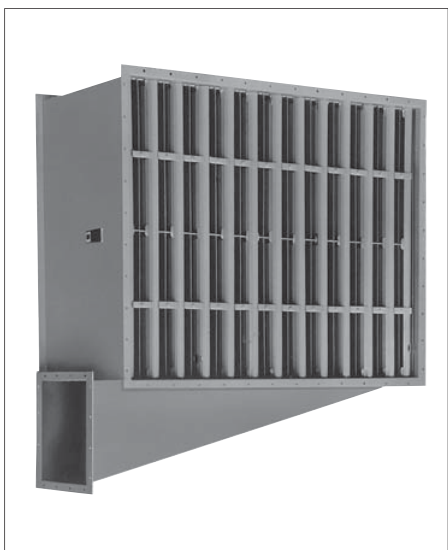
Media: Polytech HE, ultra high efficiency proprietary blended media with hot melt blown surface laminate, Polytech standard proprietary blended cellulosic and polyester fibres with a moisture resistant silicone treatment.

Efficiency: 99.99% at 0.5 μ and above.

Gasket: Polyisoprene molded closed cell gasket.

Reference	Type	Model	Media Type	Dimensions (dia. x L) mm	Media area m ²	Unit Weight kg
602F-211547003	Hemipleat Tenkey Mark III	HMPFPL-140	Flame Retardant-Standard	380 x 1000	30.2	13.6
602F-211736003	Hemipleat Tenkey Mark IV	HMPFPXL-177	Flame Retardant-Standard	380 x 1000	30.2	13.6

Dynavane



Advantages

- Constant pressure drop, self-cleaning
- Services large air volume systems at high velocities, separating contaminants through inertial separation

Application: High volume HVAC systems in high ambient dust laden applications.

Construction: 11-gauge mild steel 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 a 48,600 cfm.

INLET SCREEN:

Four-mesh galvanized inlet screen keeps out large debris.

TAPERED CELLS:

Unique engineering design controls airflow for efficient dirt removal at lowest pressure drop.

BLEED SLOT:

Rounded bleed air slot entry is an integral part of the dust pan. The rounded slot minimizes obstruction or plugging even under the worst conditions.

REMOVABLE BLADE PACKS:

Dynavane blade packs unique design provides for removal should inspection or servicing be necessary.

PRECISION VANE DESIGN:

Camfil Farr individually forms each vane, eliminating metal cracks at the stress points of stamped metal-type louvers. Camfil Farr vanes are precisely assembled and spaced for optimum efficiency and minimum pressure loss.

SIMPLE BOLT-ON INSTALLATION:

Each DynaVane is designed to readily adapt to other air handling equipment. Mounting flanges on the periphery of both air entering and air exiting sides make installation fast and trouble-free.

HOUSING:

11-gauge mild steel, all welded construction.

CONSTRUCTION:

The Dynavane's rugged construction provides for system integrity and uniform performance throughout its operating life.

BLEED AIR MANIFOLD:

Individual cell dust bins discharge separated dirt into a common manifold. The manifold outlet may be ordered on the right side, the left side, or the bottom center of the Dynavane.

Dust Collector

Gold Series



Advantages

- Modular design for optimum flexibility
- High collector efficiency using HemiPleat cartridges
- Can be customised for Original Equipment Manufacturers (OEM)
- Easy to install and maintain
- Simple cartridge replacement using quick release cam bars
- Footprint typically 25% smaller than competitor products

Application: Gold Series cartridge dust and fume collectors may be used for a wide range of pollution control and product recovery applications.

Type: Pulse cleaning, cartridge based dust collector with high performance filter elements. Cleaning is accomplished by pulse waves that emanate from the centre of the filter providing enhanced cleaning for a more efficient operation.

Construction: Strong modular construction using 4.5mm carbon steel for the frame and 3mm carbon steel for the doors, hopper and panels.

Finish: As standard in a green, durable, corrosion resistant powder coated finish. Alternative construction and colours are also available.

Options: A wide variety of options are available including: Explosion Venting, Special Inlet Designs, BIBO (bag in-bag out) for Pharmaceutical Applications, Custom Colours, Stainless Steel Construction, Alternative Hopper Designs etc. please contact us with your specific requirements.

Cartridges: Vertically mounted to shed dust readily for efficient cleaning and longer service life. High filtration efficiency meeting the 5 mg/m³ or less emissions required to re-circulate the air back into the work place on non hazardous dusts.

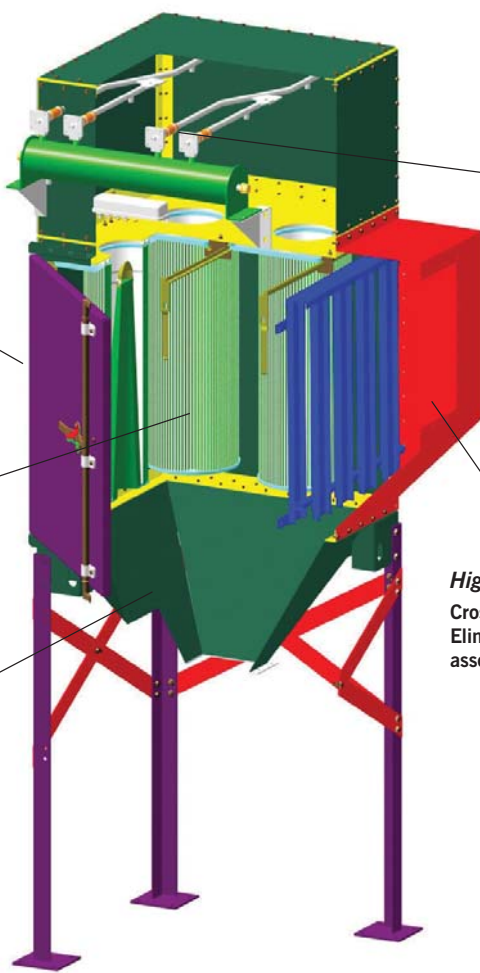
Easy Access Door

- No Knobs To Lose or Drop
- No Threads To Bind
- Mechanically Attached Seal
- Heavy 10 gauge Construction
- Lock-Out/Tag-Out Capability

Easy Changeout

Gold Cone Cartridge with patented Cambar action that positively seals the cartridges without using threads or knobs.

Optional Quick Open View Port in Hopper



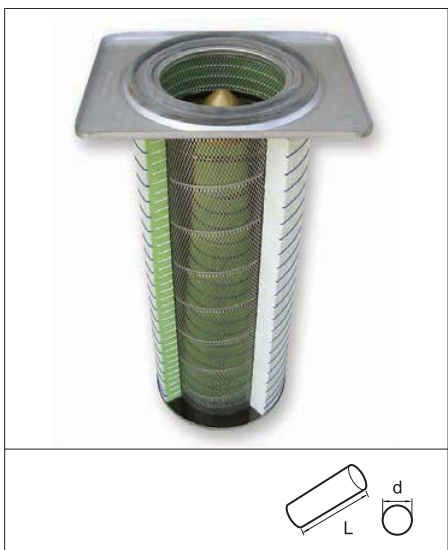
Powerful Cleaning System to Provide Long Filter Life

High Entry Inlet

Cross flow is created through the filters. Eliminates upward "can" velocities associated with traditional hopper inlets.

Dust Collector

HemiPleat Goldcone Cartridges



Advantages

- High efficiency, 99.999% at 0.5μ and larger particles by weight.
- Low pressure drop
- Reduced energy cost
- Easy to install using quick release cam bars
- Open pleat spacing to enhance cleaning cycle
- Double seal gasket for added security
- Long filter life

Application: HemiPleat cartridges may be used for a wide range of pollution control and product recovery applications.

Type: Pleated media cartridge with improved pleat spacing and media alignment.

Construction: Vertically mounted to shed dust readily for efficient cleaning and longer service life. Features a cone in the centre of the cartridge to distribute the air pulse and enhance the cleaning cycle.

Media: Several different types of filter media, pre-coat materials and over bags are available to suit specific operating conditions. Please contact us to make this selection.

Efficiency: 99.999% at 0.5μ and larger particles by weight.

Options: Filter cartridge options are available to suit specific operating conditions. These include Carbon Impregnated, Fire Retardant, Ultra High Efficiency, PTFE, and High Temperature.

Please contact us to make this selection.

Reference	Type	Model	Media Type	Dimensions (dia. x L) mm	Media area m ²	Unit Weight kg
211497-001	HemiPleat	HMPTS325	PolyTech Standard	380 x 1000	30.2	13.6
211497-002	HemiPleat	HMPTC325	PolyTech Carbon Impregnated	380 x 1000	30.2	13.6
211497-004	HemiPleat	HMPTF325	PolyTech Fire Retardant	380 x 1000	30.2	13.6
211497-005	HemiPleat	HMPTU325	Poly Tech Ultra High Efficiency	380 x 1000	30.2	13.6
211497-006	HemiPleat	HMPTUF325	Poly Tech Ultra High Efficiency Fire Retardant	380 x 1000	30.2	13.6



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Camfil Farr Offices in Asia-Pacific and Middle East

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* For enquiries, please refer to our Asia Regional Office.

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www.camfilfarr.com

On world standards...

...Camfil Farr is the global leader in clean air technology and energy efficient air filter solutions with product development, R&D and local representation in the Americas, Europe and Asia-Pacific region.

We supply high quality products and services with the aim of making our customers operations more sustainable, energy efficient and productive.

Our own vision of sustainability is a global approach combining consideration for people, environmental protection and business performance.

Camfil Farr is a member of the United Nations Global Compact programme and follows the GRI sustainability reporting framework.