Radin TahviehPakan

Good air filters are vital for indoor air quality and energy savings.
Radin Tahvieh Pakan helps customers choose the right filters and guarantees quality through expert testing.

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رادین تهویه پاکان
Radin Tahvieh Pakan

1. Introduction

Air filters play an essential role in all kinds of indoor climate areas. Not only are they essential for a good and healthy indoor climate, but they can also have a strong impact on the energy performance of buildings as well as air handling equipment. The use of ineffective air filters or a lack of filter maintenance and replacements can even nullify the efficiency gains of the entire product in which filters are incorporated.

While the above-mentioned might be common knowledge among air filter manufacturers, this is not the case with many of their customers, end users, and (especially) legislators. While for the latter the primary focus lies mostly with the products (e.g. an Air Handling Unit), the essential components of this product are often of secondary importance and tend to receive limited attention.

Radin Tahvieh Pakan Company, relying on its experiences in the air conditioning and clean room industry, can help its customers in choosing the right filter by providing advice. The advanced quality control laboratory of this company will guarantee the delivery of quality product to esteemed customers by examining the quality of the basic materials as well as the necessary tests after producing the filters.






2. Why air filters?

2.1 The importance of air filtration

Controlled air quality is crucial in many processes today. Besides many technical applications, building ventilation is a key area. Here, air filters ensure healthy indoor air by removing harmful fine dust including pollen, bacteria, yeast and molds along with other organic and inorganic material. Air filters also serve to keep the air handling equipment itself clean.

By doing so, they ensure its hygienic and efficient operation. Air purity requirements are continuously increasing. This is due to increasingly sophisticated and sensitive industrial processes, stricter environmental legislation and rising comfort and health conscious attitudes.

At the same time, the need to reduce energy consumption and carbon dioxide emissions is increasing, along with the pressure on costs. Thus, buildings are more and more restricted from natural

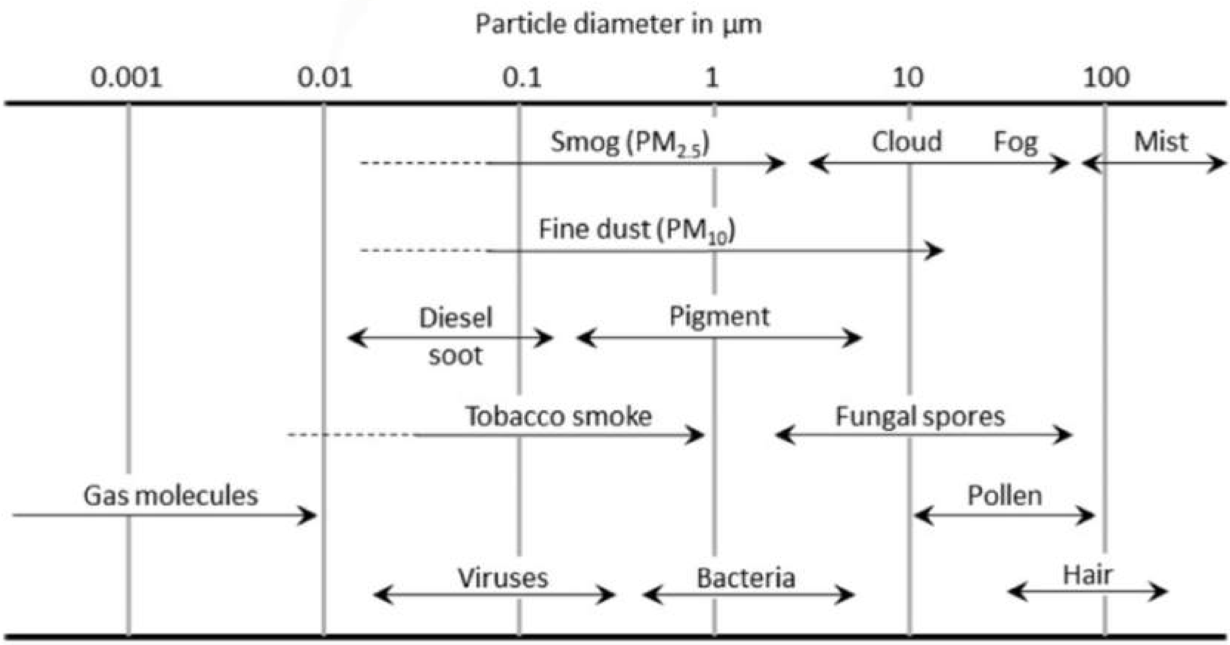
ventilation. Energy-efficient mechanical air handling and, in particular, air filtration solutions, are more in demand than ever

2.2 The composition of air

Air is defined as the gas mixture of the earth's atmosphere. The exact composition of gaseous, solid and liquid components (particles) dispersed in the air varies greatly depending on time and location.

Dry, particle-free air is mainly composed of two gases: nitrogen (around 78%) and oxygen (around 21%).

There are also traces of argon, carbon dioxide and other gases, as well as varying amounts of water vapor, which is typically in the range of several grams per cubic meter of air.



General guide to particle size distribution of common atmospheric contaminants ranges. The scale shows that the various contaminants cover a size range of several orders of magnitude.

This is a major reason why so many different filters are used in a wide variety of classes and designs.

The common technical classification of fine dust fractions is also based on the classification of particle sizes according to the areas they are deposited in the human respiratory system.

The classes are PM10 (particles with an aerodynamic diameter of ‹ 10 µm), PM2.5 (‹ 2.5 µm) and PM1 (‹ 1 µm).

PM stands for particulate matter. There has been a recent addition to the established particle size classes: particle fractions with a diameter of ‹ 100 nm.

Particles of this size are referred to as ultrafine particles (UFP) or nanoparticles.

The mechanisms for the separation of particles and gaseous contaminants from the air are fundamentally different.

Particles are separated by mechanical or electromechanical effects whereas gases are generally separated by adsorption or absorption.

3. Benefits from using air filters

The aim of using air filters is to protect people's health by maintaining a good hygiene level in the ventilation system and clean indoor air quality (IAQ). It is commonly known that air pollution is unhealthy, but it is not so well known that the smallest particles are the most dangerous. The aspects could be different depending on the outdoor air quality and the indoor activities. The urban air quality is nowadays polluted by small PM1 particles and gases coming from combustion and diesel engines , which city centers are crowded with. Additionally, for hygiene reasons, bacterial and fungal spores must be removed from the air stream, which are typically in a size range between 1 and 10 μm. Therefore, for the human health and indoor hygiene, it is important to clean the inlet air with sufficient air filters. The most common air filters in comfort ventilation are ePM1, ePM2,5 and ePM10. ePM1 is recommended in buildings such as schools, hospitals, office buildings, apartments and residential facilities.

”

Air filled with the spirit of life. This air is ideal.

4. Fundamentals of air filtration

4.1 Particle separation

The most common method of separating particles from gas streams in HVAC systems and in industrial applications is through fiber filters. Other processes for particle separation such as cyclones, scrubbers or electrostatic precipitators are generally more complex and are therefore only used in specific industrial areas. The following section examines fiber filtration in detail.

The efficiency of a filter for separating particles is usually described using separation efficiency, also referred to as fractional efficiency. This is defined as the ratio of the number of particles of a particular size that have been deposited in the filter to the total number of particles of this size upstream of the filter. Filter efficiency can be defined both in terms of quantity and mass (the mass of arrested dust in relation to the total dust mass fed to the filter is named gravimetric arrestance). When specifying filter performance, it is therefore important to always be sure about the particle size on which the data is based and whether it is defined in terms of quantity or mass. Values can only be compared that have been measured according to the same standard. This is because different standards are usually based on different measurement methods and are therefore not directly comparable. Typically, in building ventilation and HVAC applications, fiber filter media is used, where the average pore size is significantly larger than the size of particle to be arrested. Particles can enter the filter medium and could pass through it, if they could follow the air streamlines perfectly. Since this is not the case, there is a certain probability that on their way through the filter media, particles will hit a fiber, where they will be deposited and remain. Figures 2a to 2d show the mechanisms that lead to a particle hitting a fiber. The mechanisms are:

a) Interception, b) Inertial Impaction c) Diffusion and d) Electrostatics

a) Interception

Interception occurs when a particle which is following a gas streamline comes within one particle radius of a filter fiber. The particle touches the fiber and is captured, thus being removed from the gas flow. This is illustrated in.

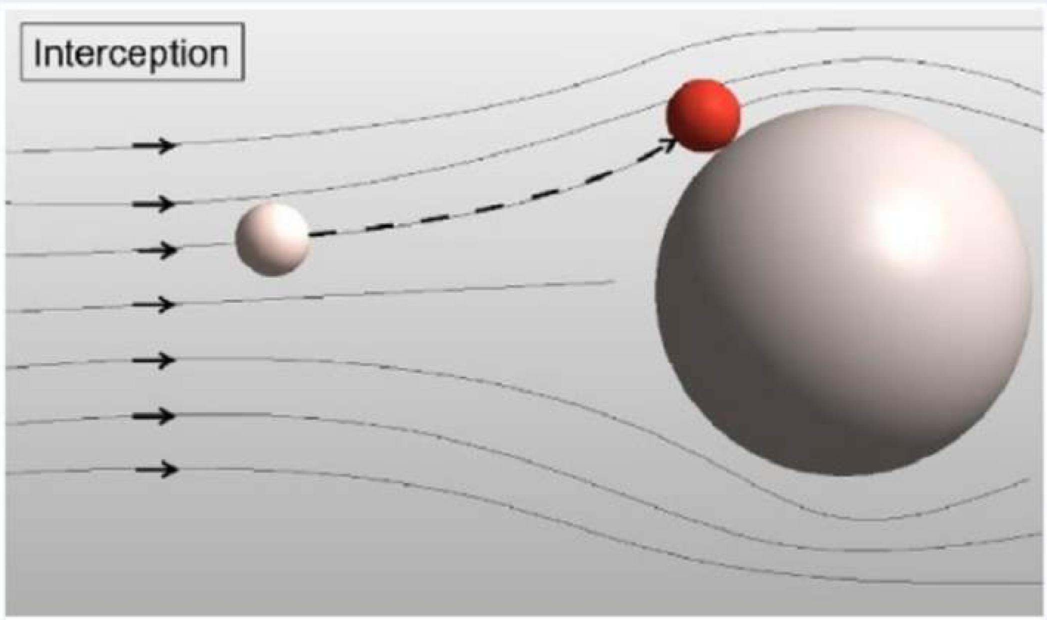


Figure 1

For a given particle size, there are certain streamlines which will move close enough to a filter fiber so that the particle will be captured. Streamlines further than one particle radius away from a filter fiber will not contribute to the interception mechanism

b) Inertial Impaction

Inertial impaction occurs when a particle is so large that it is unable to quickly adjust to the abrupt changes in streamline direction near a filter fiber. The particle, due to its inertia, will continue along its original path and hit the filter fiber. This type of filtration mechanism is most predominant when high gas velocities and dense fiber packing of the filter media is present.

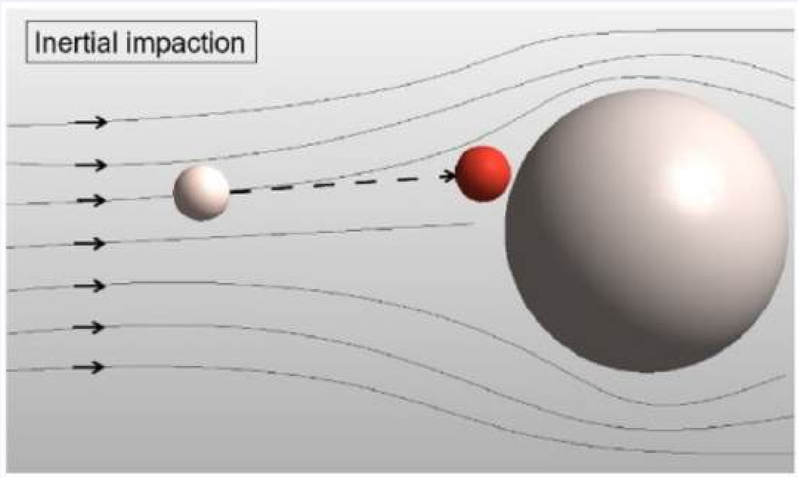


Figure 2

c) Diffusion

To explain the diffusion mechanism of particle capture, we first need to do a quick review of the kinetic theory of gases. This theory explains that a gas is composed of a large number of molecules which are small in size when compared to the distances between them. These molecules behave like ridged spheres which travel in straight lines when they're not bumping into each other. In actuality, these molecules collide with each other so much that they move in random, zigzagging path. This random motion is referred to as Brownian motion.

The diffusion mechanism of particle retention is the result of the Brownian motion of gas molecules. Small particles, with diameters in the range of 0.1 μm and below, tend to make random motions due to their interaction with the zigzagging gas molecules. As these small particles are bumped by the gas molecules they too begin moving randomly about, bumping into other particles as well

Diffusion is predominant with low gas velocities and smaller particles. The smaller a particle is and the slower the flow, the more time it will have to zigzag around, thereby giving it much better chance of hitting and sticking to a filter fiber.

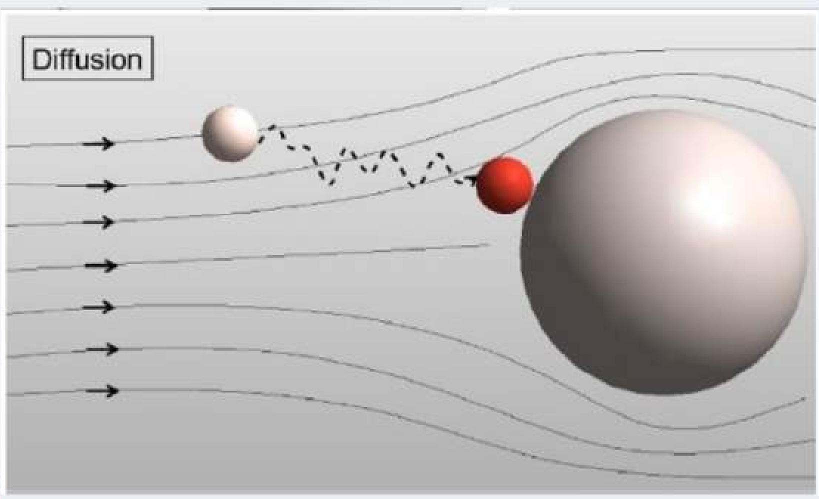


Figure 3

d) Electrostatic attraction

is a method that is captured both large and small particles from the airstream. In this method, electrically charged fibers or granules are considered in the filter to absorb oppositely charged particles from the airstream. The electrostatic mechanism of attachment is weakened by rising speed. Because electrostatic fields increase the filtration efficiency of filter media without increasing flow resistance, and hence pressure drop, such filter media are particularly energy-efficient However, there is a possibility that under certain conditions (e.g. very high humidity or a very high proportion of submicron particles in the air to be filtered) the electrostatic charge could be reduced during the filtration operation. This could ultimately lead to a decrease in the filtration efficiency of the filter.

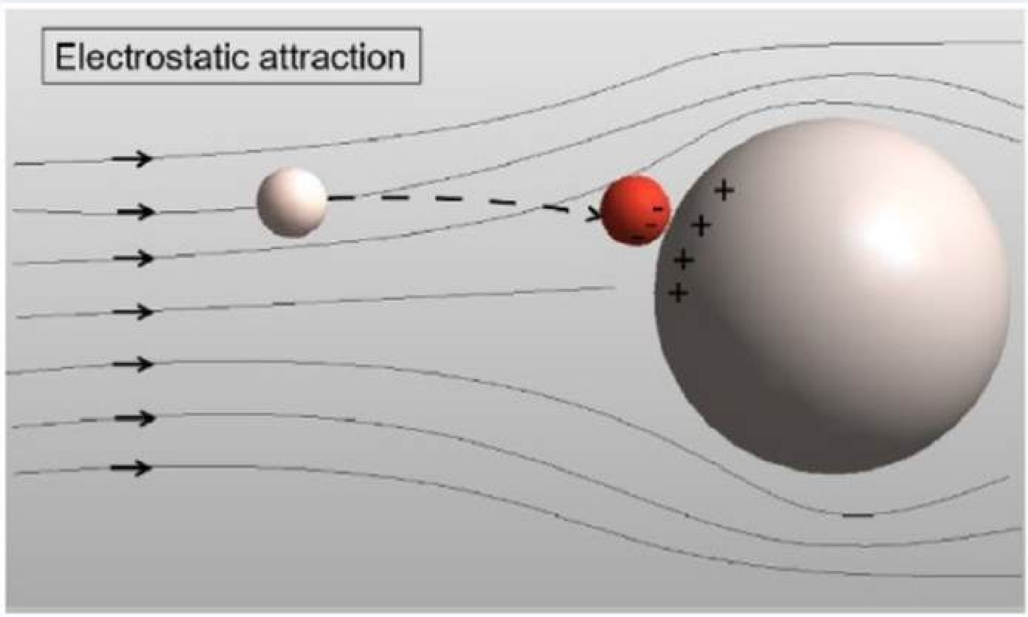
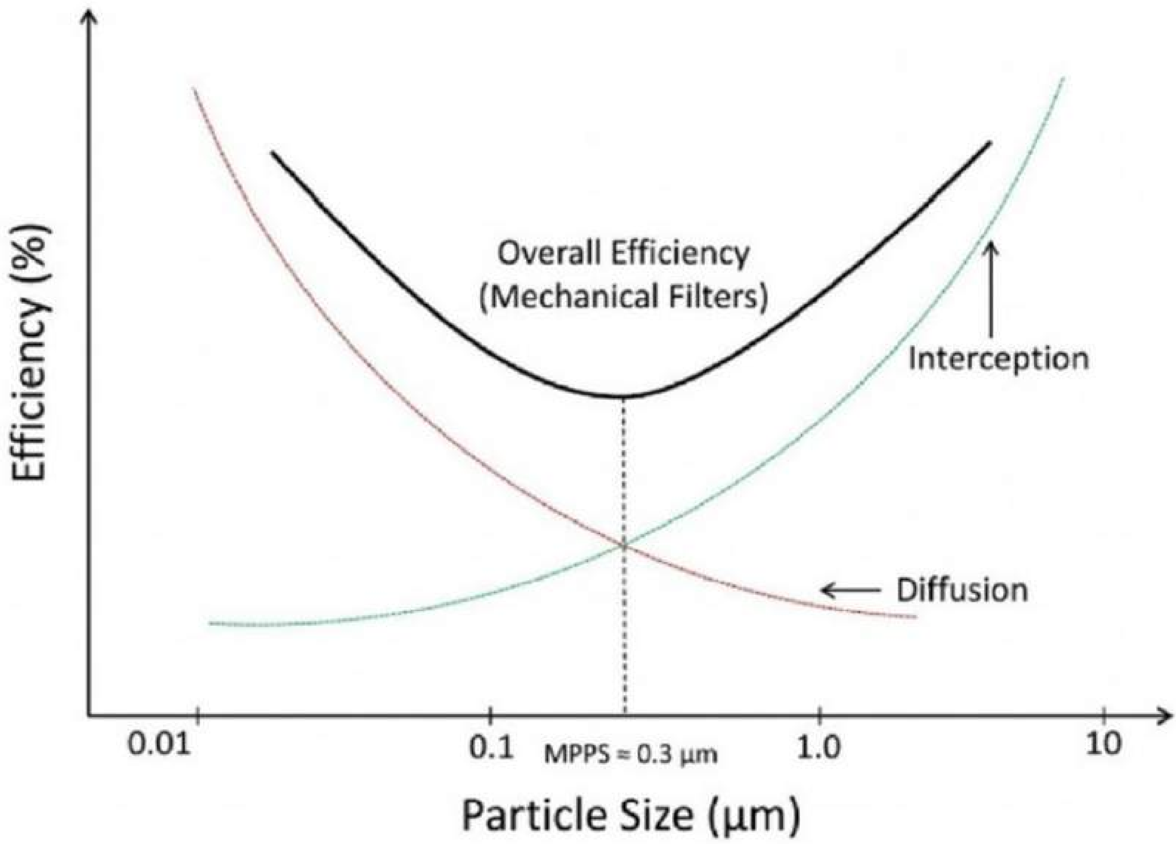


Figure 4

You can see Contribution of interception and diffusion mechanisms in accordance with the particle size bellow :



4.2 removal of gaseous contaminants

In addition to particles, a wide variety of types and concentrations of contaminant gases can be found in the air.

4.2.1 Adsorption and absorption

Technically speaking, these are largely removed from the air by sorption, i.e. adsorption or absorption.

Adsorption refers to the accumulation of substances from the gas phase (adsorbate) on the surface of a solid (adsorbent).

This is different from absorption, in which substances penetrate the interior of a solid or a liquid and dissolve therein.

Adsorption is generally a physical process, in which atoms or molecules attach themselves to the surface of a solid via van der Waals forces.

In this case, we talk of Physisorption.

The strength of this adhesive force depends on the material combination. The rate of sorption (i.e. the quantity of contaminant gas deposited or released per time unit) depends on temperature, contaminant gas concentration, rate of diffusion from the gas phase to or away from the surface of the adsorbent.

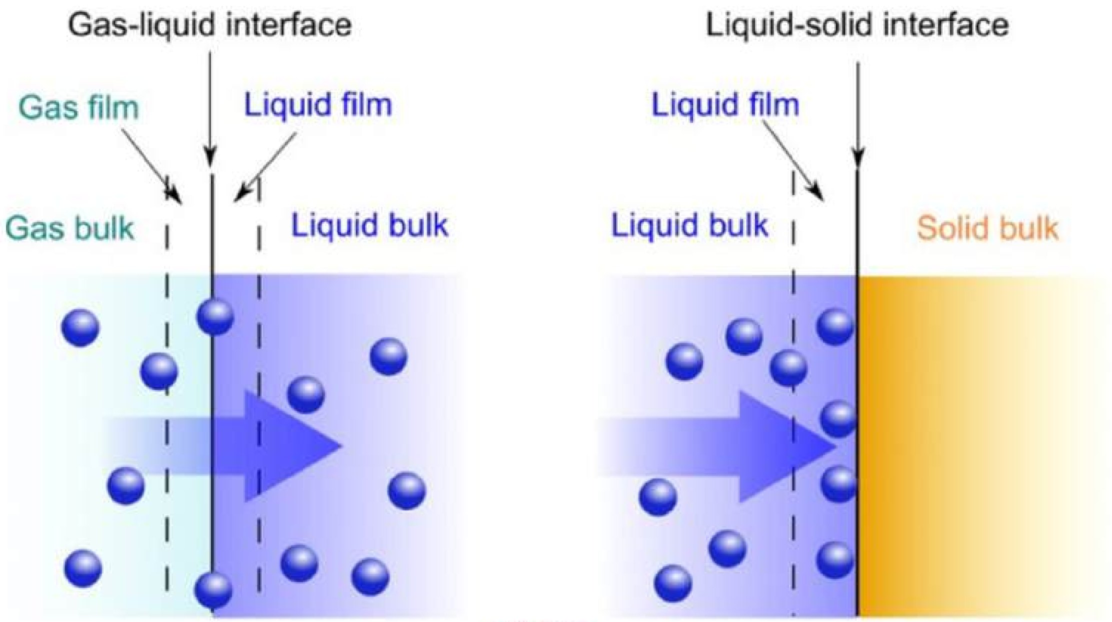


Figure 5

4.2.2 Common absorbents

The most commonly used adsorbent in technical applications is activated carbon, which usually adsorbs a large, very nonspecific number of different gases, such as aliphatic or cyclic hydrocarbons (VOC) and alcohols.

For this reason, it is often used to arrest odors in industrial air handling and building HVAC systems. In practical use, the high affinity of water vapor (humidity) to activated carbon is problematic as, in the case of pure physisorption, water can displace (desorb) many other substances and decrease the adsorption efficiency of the activated carbon.

5. Standards

Most people, and with this we mean end users, have no idea how to rate the quality of an air filter.So how can you establish the certainty that the product you bought or wish to buy does the job?

EN 779:2012	Coarse Filters Average Arrestance (Am) Final Test Pressure Drop 250 [Pa]	**50% ≤ Am < 65% G1**	**65% Am < 80% G2**	**80% ≤ Am < 90% G3**		**90% ≤ Am G4**							
EN 779:2012	Medium- and Fine Filters Average Efficiency (Em) and Minimum Efficiency(M.E.) of 0.4 um particles Final Test Pressure Drop 450 [Pa]	40% ≤ Em < 60% M5	60% ≤ Em < 80% M6	80% ≤ Em < 90% M.E.: 35% F7		90% ≤ Em < 95% M.E.: 55% F8	95% ≤ Em M.E.: 70% F9						
EN 1822:2009	(H)EPA- and ULPA-Filters Efficiency	Overall Value ≥ 85% E10	Overall Value ≥ 95% E11	Overall Value ≥ 99.5% E12		Overall Value ≥ 99.95% H13 Local Value ≥ 99.75%	Overall Value ≥ 99.995 % H14 Local Value ≥ 99.975 %	Overall Value ≥ 99.9995 % U15 Local Value ≥ 99.9975 %	Overall Value ≥ 99.999 9 5% U16 Local Value ≥ 99.999 7 5%	Overall Value ≥ 99.9999 95% U17 Local Value ≥ 99.9999 %			
ASHRAEStandard 52.2-2007	Minimum Efficiency Reporting Value (MERV)	MERV 1-4	MERV 1-4	MERV 5		MERV 6-8	MERV 8-10	MERV 9-13	MERV 13-14	MERV 14-15	MERV 16	MERV 16	**MERV 16**

6. Filter design

6.1 Filter design

A good filter in an air handling unit creates a clean and healthy environment. At the same time, it keeps the air handling unit and its important components free from contamination so the heat exchanging equipment in the unit can maintain its efficiency over time.

When considering general ventilation systems, the most important factor for the end user is the filter performance. This includes filtration efficiency, designed air flow rate, initial and average pressure drop – affecting directly energy consumption, expected service life, and in some cases resistance to temperature.

Other important issues are related to recycling and environmental protection

Looking at the basics of today's most common air filters, three major contributors to the performance of air filters can be determined:

- Filter media, characteristic and m^2 inside a filter, required filter class and dust holding capacity.
- Filter construction, flow pattern through the filter.
- Cell side material.

6.2 Filter media

Filter media can be selected for many filter classes. In general, the amount of fibers and size of the fiber determine the efficiency. The higher the efficiency, the higher the pressure drops.

For filters that require a high dust holding capacity, media surface needs to be created that can hold the dust while maintaining the possibility for air to move through the media and filter. These filters are often the pocket filters as installed in air handling units.

If less dust holding capacity is required (often the second stage filters in an air handling unit), so called compact filters are normally used.

This media is different from the pocket filter media and has lower dirt holding capacity.

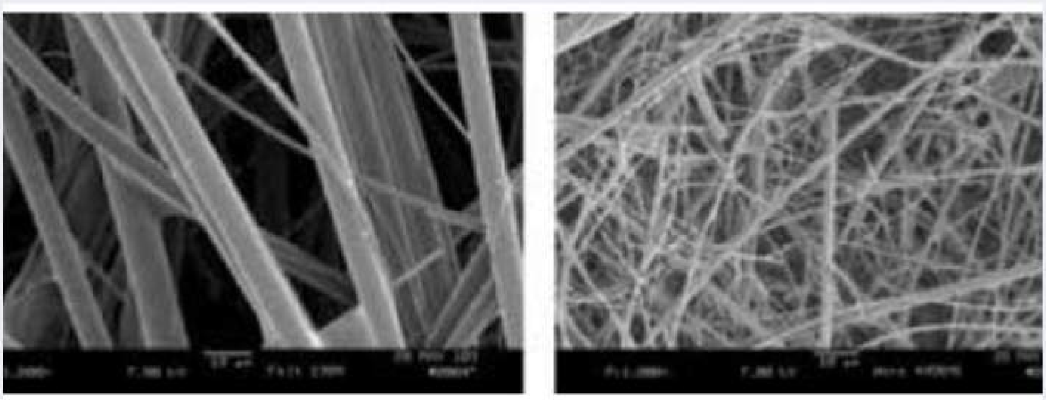
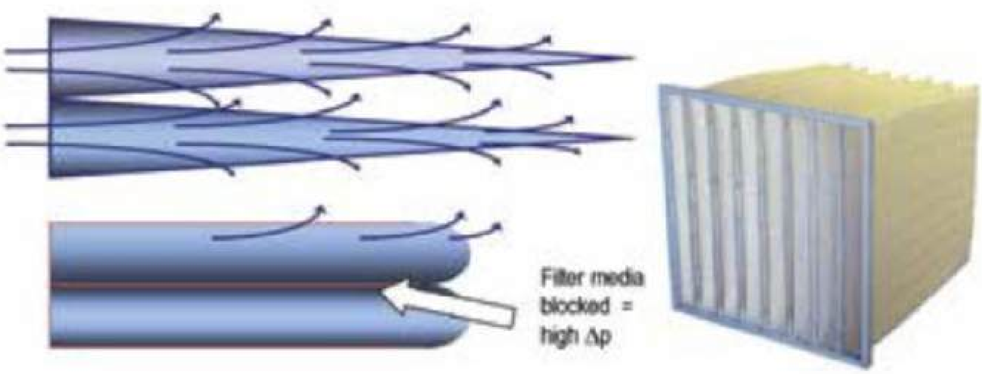


Figure 6

6.3 Filter construction

The shape and the construction details of the filter have essential influence on the pressure drop.



Schematic air flow in correctly designed and poor quality bag filter

Figure 8

To reduce the pressure drop over the filter, it is important that the design of the filter is such that the air velocity through the media is as equal as possible. The characteristics of the media, the media amount, thickness and shape determine the performance of the filter. The same theory is applicable for the pleat shape of a compact filter. The influence on the pressure drop is significant and an incorrect pleat shape will increase the resistance.

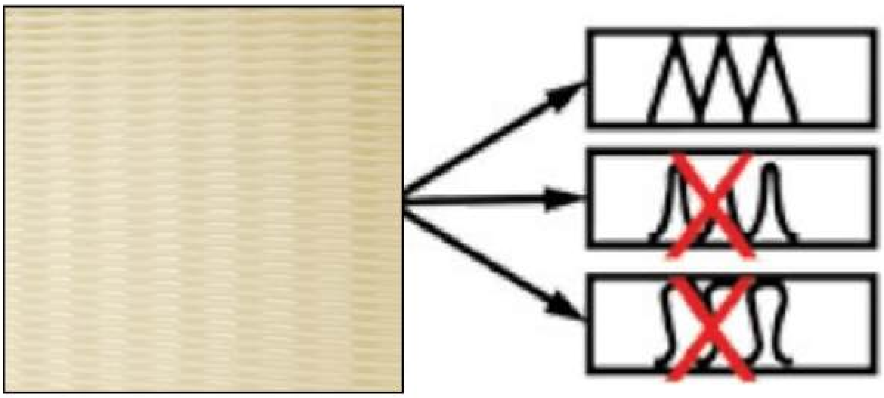


Figure 7

Correct and incorrect pleat shape configuration

As for the pocket filters, the air flow velocity should be even over the complete media surface. This is required to have the lowest resistance possible on the selected media. Looking at the velocity through a V-shape mini pleat filter, the face velocity is the incoming velocity on a filter. This velocity changes through the filter.

For these types of filters, the configuration and shape of the filters play an important role on the performance.

For filter cell sides, most common materials used are:

- Plastic,
- Metal (galvanized steel, stainless steel),
- Wood (MDF – particle board, Ply wood, beech wood).

The wooden cell sides are often selected out of environmental reasoning (low CO2 foot print, renewable source) or for filters that need to be fully incinerable. Plastic cell sides have, especially when casted, a lot of freedom in geometry. This enables the designer to fully optimize the geometry with the selected filter media.

Metal is often used for filters that are installed in higher temperature application. A metal filter is very robust. Stainless steel is often selected when installed in a corrosive environment or when cleaning or shedding might be of concern.

7. Key applications for air filters

There are plenty of air filtration solutions for a wide range of industries. The key applications of air filters covered in this guidebook are described in the following

7.1 Comfort (General HVAC)

HVAC stands for Heating, Ventilation and Air Conditioning. These are some concepts designed to improve our comfort of living. The indoor air temperature can be set to our preferences. When there is hot weather, the indoor temperature can be lowered through air conditioning. When there is cold weather, the complete opposite can be done, and the indoor temperature can be increased through heating.

This is very often combined with ventilation, which involves bringing fresh outside air into the building. Outdoor air must be filtered to achieve the desired indoor air quality and to protect the people against particulate matter. This is very important, given that a poor indoor air quality is known to significantly affect the attitude, concentration, productivity and health of people.

7.2 Residential

The need for good filtration and high quality commercial air filters is becoming more and more obvious to most people around the world. People perform better with clean air and a healthy indoor climate. Research proves that high-efficiency commercial air filters reduce the problems that small particles can cause for sensitive people.

It goes without saying that the protection against particulate matter is a very important factor for commercial and office buildings. But it is not limited to these types of buildings.

Residential air cleaners designed for home usage (in bedrooms and living rooms for example) are becoming more common and accepted nowadays.

7.3 Medical

Air filtration is very important in healthcare facilities. The level of airborne infectious contaminants increases proportionately with the increased population density of infected individuals. Infections are a concern, especially in surgery rooms but not limited to hospitals only. Nursing homes and dental offices or clinics also need efficient filtration to prevent bacterial infections

Other important fields of application for air filters, but basically of different construction than used in general ventilation, are industries such as automotive, paint booths, optical, microelectronics or power generation.

7.4 Pharmaceutical

In clean rooms of the pharmaceutical industry and due to the sensitivity of the drug production process, minimizing particles and pollutants in the air inlet is very important. Lack of proper filtration disrupts the drug production process. Suspended particles, radioactive material or live viruses and bacteria may also be present in the air outlet, and it is important to filter them thoroughly before entering the environment.

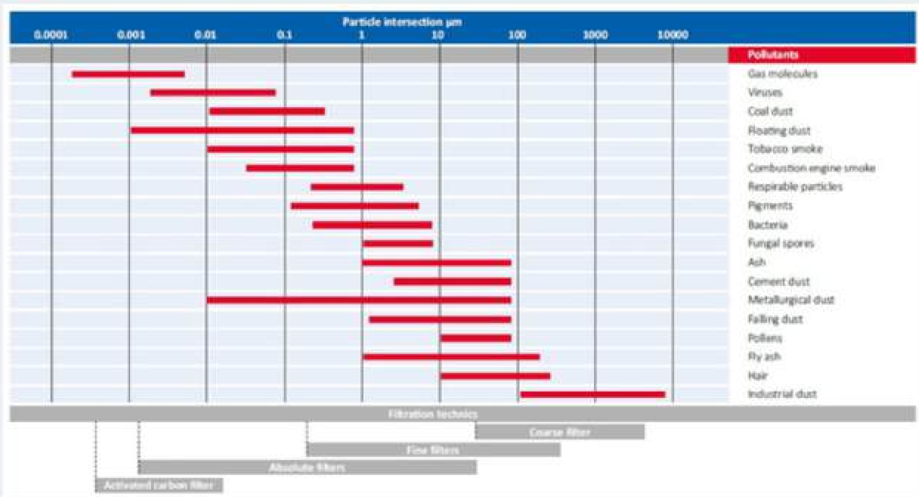
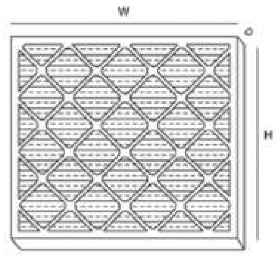


Figure 9

Aluminium filter

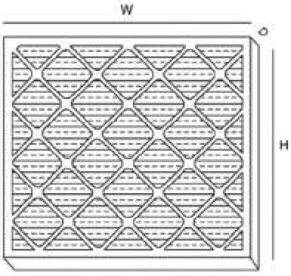


G2	کلاس فیلتر بر اساس EN779
EU2	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
چند لایه توری آلومینیوم	جنس مدیا
200 C	Max temperature
100%	Max relative humidity
ندارد	نوار هوابند

کد کالا	ابعاد (mm)	Air flow (Ft3/min)	Initial pressure drop(Pa)	Final pressure drop(Pa)
RT-592*592*48- AL	592*592*48	2000	35	150
RT-287*592*48- AL	287*592*48	1000	35	150
RT-287*287*48- AL	287*287*48	500	35	150
RT-490*592*48-AL	490*592*48	1700	35	150
RT-490*490*48-AL	490*490*48	1400	35	150

Other sizes can be custom made.

Pleated filter



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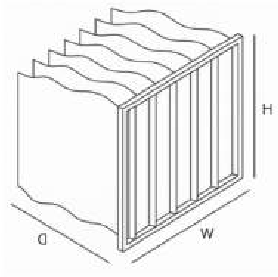
EU4	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
پلی استر	جنس مدیا
80 c	Max temperature
80%	Max relative humidity
ندارد	نوار هوابند

کد کالا	ابعاد (mm)	Air flow (Ft3/min)	Media Area (m²)	Initial pressure drop(Pa)	Final pressure drop(Pa)
RT-592*592*48-P-G4	592*592*48	2000	0.9	70	150
RT-287*592*48-P-G4	287*592*48	1000	0.4	70	150
RT-490*592*48-P-G4	490*592*48	1700	0.7	70	150
RT-490*490*48-P-G4	490*490*48	1400	0.6	70	150

Other sizes can be custom made.

Bag filter



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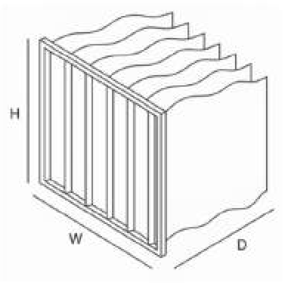
EU5	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Synthetic micro fiber	جنس مدیا
80 C	Max temperature
90%	Max relative humidity
آپشنال	نوار هوابند

کد کالا	ابعاد (mm)	تعداد کیسه	Air flow (Ft3/min(	Media Area (m^2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*360-6M5	592*592*360	6	2000	2.8	60	450
RT-287*592*360-3M5	287*592*360	3	1000	1.4	60	450
RT-490*592*360-5M5	490*592*360	5	1700	2.3	60	450
RT-592*592*535-6M5	592*592*535	6	2000	4.1	55	450
RT-287*592*535-3M5	287*592*535	3	1000	3.4	55	450
RT-490*592*535-5M5	490*592*535	5	1700	2	55	450
RT-592*592*630-6M5	592*592*630	6	2000	4.9	45	450
RT-287*592*630-3M5	287*592*630	3	1000	2.4	45	450
RT-490*592*630-5M5	490*592*630	5	1700	4.1	45	450

Other sizes can be custom made.

Bag filter



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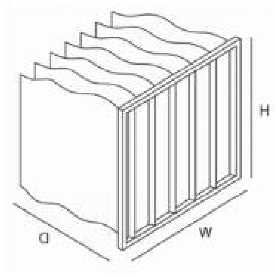
EU6	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Synthetic micro fiber	جنس مدیا
80 C	Max temperature
90%	Max relative humidity
آپشنال	نوار هوابند

کد کالا	ابعاد (mm)	تعداد کیسه	Air flow (Ft^3/min)	Media Area (m^2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*360-6M6	592*592*360	6	2000	3.6	80	450
RT-287*592*360-3M6	287*592*360	3	1000	1.8	80	450
RT-490*592*360-5M6	490*592*360	5	1700	2.7	80	450
RT-592*592*535-6M6	592*592*535	6	2000	5.3	70	450
RT-287*592*535-3M6	287*592*535	3	1000	2.6	70	450
RT-490*592*535-5M6	490*592*535	5	1700	4	70	450
RT-592*592*630-6M6	592*592*630	6	2000	6.3	55	450
RT-287*592*630-3M6	287*592*630	3	1000	3.1	55	450
RT-490*592*630-5M6	490*592*630	5	1700	4.8	55	450

Other sizes can be custom made.

Bag filter

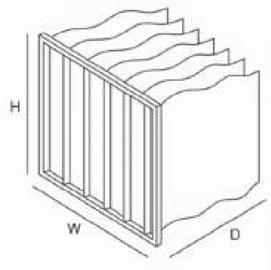


کلاس فیلتر بر اساس EN779	F7
کلاس فیلتر بر اساس EUROVENT	EU7
جنس قاب	ورق گالوانیزه یا ورق آلوزینک
جنس مدیا	Synthetic micro fiber
Max temperature	80 C
Max relative humidity	90%
نوار هوابند	آپشنال

کد کالا	ابعاد (mm)	تعداد کیسه	Air flow (Ft^3/min)	Media Area (m^2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*360-6F7	592*592*360	6	2000	3.6	110	450
RT-287*592*360-3F7	287*592*360	3	1000	1.8	110	450
RT-490*592*360-5F7	490*592*360	5	1700	2.7	110	450
RT-592*592*535-6F7	592*592*535	6	2000	5.3	100	450
RT-287*592*535-3F7	287*592*535	3	1000	2.6	100	450
RT-490*592*535-5F7	490*592*535	5	1700	4	100	450
RT-592*592*630-6F7	592*592*630	6	2000	6.3	85	450
RT-287*592*630-3F7	287*592*630	3	1000	3.1	85	450
RT-490*592*630-5F7	490*592*630	5	1700	4.8	85	450

Other sizes can be custom made.

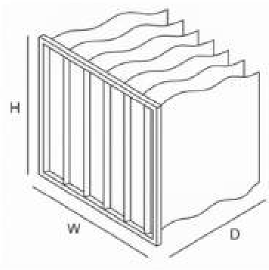
Bag filter



F8	کلاس فیلتر بر اساس EN779
EU8	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Synthetic micro fiber	جنس مدیا
80 C	Max temperature
90%	Max relative humidity
آپشنال	نوار هوابند

کد کالا	ابعاد (mm)	تعداد کیسه	Air flow (Ft3/min)	Media Area (m^2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*360-6F8	592*592*360	6	2000	3.6	120	450
RT-287*592*360-3F8	287*592*360	3	1000	1.8	120	450
RT-490*592*360-5F8	490*592*360	5	1700	2.7	120	450
RT-592*592*535-6F8	592*592*535	6	2000	5.3	110	450
RT-287*592*535-3F8	287*592*535	3	1000	2.6	110	450
RT-490*592*535-5F8	490*592*535	5	1700	4	110	450
RT-592*592*630-6F8	592*592*630	6	2000	6.3	100	450
RT-287*592*630-3F8	287*592*630	3	1000	3.2	100	450
RT-490*592*630-5F8	490*592*630	5	1700	4.8	100	450

Other sizes can be custom made.

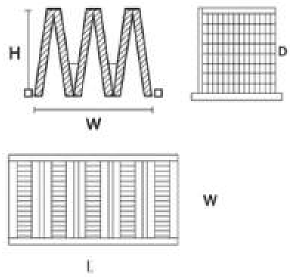


F9	کلاس فیلتر بر اساس EN779
EU9	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Synthetic micro fiber	جنس مدیا
80 C	Max temperature
90%	Max relative humidity
آپشنال	نوار هوابند

کد کالا	ابعاد (mm)	تعداد کیسه	Air flow (Ft3/min)	Media Area (m2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*360-6F9	592*592*360	6	2000	3.6	190	450
RT-287*592*360-3F9	287*592*360	3	1000	1.8	190	450
RT-490*592*360-5F9	490*592*360	5	1700	2.7	190	450
RT-592*592*535-6F9	592*592*535	6	2000	5.3	180	450
RT-287*592*535-3F9	287*592*535	3	1000	2.6	180	450
RT-490*592*535-5F9	490*592*535	5	1700	4	180	450
RT-592*592*630-6F9	592*592*630	6	2000	6.3	175	450
RT-287*592*630-3F9	287*592*630	3	1000	3.2	175	450
RT-490*592*630-5F9	490*592*630	5	1700	4.8	175	450

Other sizes can be custom made.

V – type compact filter

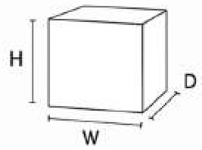


F7, F8, F9	کلاس فیلتر بر اساس EN779
EU7, EU8, EU9	کلاس فیلتر بر اساس EUROVENT
PLASTIC	جنس قاب
Glass fiber paper	جنس مدیا
70 C	Max temperature
90%	Max relative humidity
آپشنال	نوار هوابند

کد کالا	ابعاد (mm)	Filter class	Air flow (Ft3/min)	Media Area (m²)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-592*592*292-R-F7	592*592*292	F7	2000	18.8	115	600
RT-592*592*292-R-F7	592*287*292	F7	1000	15.3	115	600
RT-592*592*292-R-F8	592*592*292	F8	2000	18.8	125	600
RT-592*592*292-R-F8	592*287*292	F8	1000	15.3	125	600
RT-592*592*292-R-F9	592*592*292	F9	2000	18.8	145	600
RT-592*592*292-R-F9	592*287*292	F9	1000	15.3	145	600

Other sizes can be custom made.

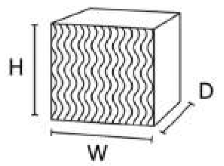
V-type hepa filter



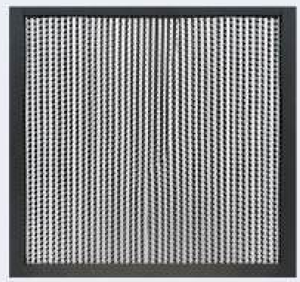
H13 , H14	کلاس فیلتر بر اساس EN779
EU13 , EU14	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Glass fiber paper	جنس مدیا
70 C	Max temperature
90%	Max relative humidity
Polyurethane	نوار هوابند
Hotmelt	Spacers

کد کالا	ابعاد (mm)	Filter class	Air flow (Ft^3/min)	Media Area (m^2)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-610*610*292-HF-H13	610*610*292	H13	2000	37	250	600
RT-305*610*292-HF-H13	305*610*292	H13	1000	18.5	250	600
RT-592*592*292-HF-H13	592*592*292	H13	1850	35	250	600
RT-287*592*292-HF-H13	287*592*292	H13	950	17.5	250	600
RT-610*610*292-HF-H14	610*610*292	H14	2000	37	250	600
RT-305*610*292-HF-H14	305*610*292	H14	1000	18.5	250	600
RT-592*592*292-HF-H14	592*592*292	H14	1850	35	250	600
RT-287*592*292-HF-H14	287*592*292	H14	950	17.5	250	600

Other sizes can be custom made.



Hepa filter



H13 , H14	کلاس فیلتر بر اساس EN779
EU13 , EU14	کلاس فیلتر بر اساس EUROVENT
ورق گالوانیزه یا ورق آلوزینک	جنس قاب
Glass fiber paper	جنس مدیا
70 C	Max temperature
90%	Max relative humidity
Polyurethane	نوار هوابند
Hotmelt	Spacers

کد کالا	ابعاد (mm)	Filter class	Air flow (Ft3/min)	Media Area (m²)	Initial pressure drop(pa)	Final pressure drop(pa)
RT-305*305*150-H13	305*305*150	H13	195	2.6	250	600
RT-457*457*150-H13	457*457*150	H13	440	6	250	600
RT-305*610*150-H13	305*610*150	H13	390	9	250	600
RT-457*610*150-H13	457*610*150	H13	610	12	250	600
RT-610*610*150-H13	610*610*150	H13	780	18	250	600
RT-610*915*150-H13	610*915*150	H13	1155	27	250	600
RT-305*305*150-H14	305*305*150	H14	195	2.6	270	600
RT-457*457*150-H14	457*457*150	H14	440	6	270	600
RT-305*610*150-H14	305*610*150	H14	390	9	270	600
RT-457*610*150-H14	457*610*150	H14	610	12	270	600
RT-610*610*150-H14	610*610*150	H14	780	18	270	600
RT-610*915*150-H14	610*915*150	H14	1155	27	270	600

Other sizes can be custom made.