
MountainAir®
Extaordinary
Filters
VOTED
NORTH AMERICA'S BEST FILTER
FOUR TIMES
BABYLON
MANUFACTURING & TRADING CO.
BABYLON
MANUFACTURING & TRADING CO.
ELIMINATE ODOURS COMPLETELY

Contents

BABYLON
MANUFACTURING & TRADING CO.

14 of 19 sizes pictured.
World's largest range -
We've got your filter.

Fan Types

You can use two main fan types with the MountainAir® Filter.

1 Mixed-Flow Fan
2 Centrifugal fan

3 A third common fan type is the radial fan. This type is not suitable for use with the MountainAir® Filter as it is meant to be used in free-flowing or near free-flowing situations.

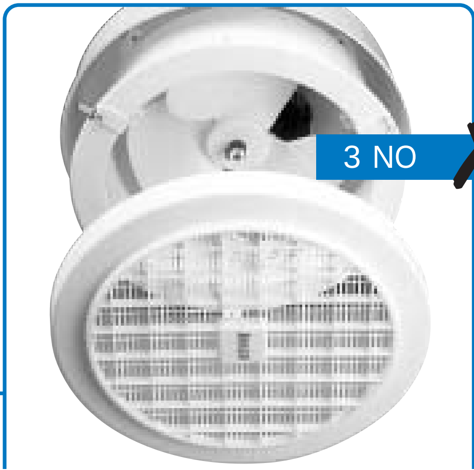
Quick Guide:

Invest in a quality fan. The best choice is a centrifugal fan.

Look for backward curved impellers (relative to airflow), and capacitor start/capacitor run, permanent split capacitor, or capacitor start/induction run type motors (in that order). Avoid split-phase and shaded-pole type motors & Chinese-made fans, and never buy a fan that does not appear to be in perfect balance.

1 YES ✓

2 YES ✓



3 NO ✗

Filter Selection Principles

In most cases, it will be the amount of heat generated by the lights that determines the correct minimum fan and filter size.

The daytime growing area temperature should ideally be between 21ºC and 27ºC (70º - 81º Fahrenheit); and never more than 32ºC (90ºF).

Are you replacing an existing exhaust fan with a filter and a new fan suitable for use with the filter?

YES

You should make sure that the new fan/filter assembly moves at least as much air as the old fan. The airflow rating of the old fan may be shown on the compliance plate. If it is not, contact the fan manufacturer or us to find out the airflow rating. To select a suitable fan and filter, ovelay the pressure curve of the new fan onto the pressure drop curves on page 7. The intersection (where the lines cross) will be about the operating airflow.

NO

You need to check the filter wattage chart. This chart indicates the capacity of the filters by size, expressed as the number of watts of lighting in the growing area. This table is a generalization due to the variation between growing rooms.

Quick Guide to Selection Chart:

**Indicative airflows: These airflows are indicative of the 37-month intensive flowering room filter-testing program, at the end of which time the tested filters were still 100% effective. Other manufacturers cite initial airflows. We have found these ratings to be the most economical area in which to run the filters. IE Less electrical usage, fan wear, air noise, et cetera.*

***Max recommended airflows: MountainAir filters can handle considerably more airflow than the recommended high ratings represent. However, there are tradeoffs when running any air handling system at high air pressures. There is a point at which it is more economical to go up to the next size filter, and this is what the maximum rating represents. For example, you could force a 500 CF/M fan onto a MA0620 filter; however, this is no way to run a filtration system. It would be more economical to run this fan with a MA1020. Although a larger filter may cost a little more, the savings in electrical usage, air noise, fan wear, and so forth is a great trade-off.*

Over the life of the system, the additional cost will pay for itself many times over. The wattages listed in the above chart are based on a hot summer climate: most of Australia, California, Texas, et cetera. If you live in a moderate or cool summer climate, these figures are conservative.

Installation Options

1 The filter is outside the growing room with the exhaust fan running continuously. If using an anti-dust-sock, use an interior size.

2 The filter is inside the growing area with the exhaust fan running continuously. If using an anti-dust-sock, use an exterior size.

3 To use the MountainAir® filter inline (rather than as a terminus as in 1 & 2). Place the filter inside a large plastic drum with duct holes cut into the top and into one side. Attach ducting to the side hole as the outlet. Seal the neck of the filter to the hole in the top of the drum, making an airtight area around the filter. This method is only recommended if you must use more than five meters of ducting with a single fan. The benefit is that the fan is closer to the center of the pressure system.

4 For CO_2 injection situations. The filter stands in the growing area with the fan sitting in the neck of the filter. Position the filter in the area of the growing room with least air movement to provide additional circulation. The filter fan runs continually but the vent fan is only on periodically. Accommodate seasonal climatic variations and CO_2 concentration variations by hardwiring a variable (fan) speed controller to a climate controller - do not use variable light dimmers, as they will burn out. Some odors will escape unless a second filter is used on the exhaust fan.

Quick Guide:

Methods 1 & 2 are equally effective. Always exhaust from the top of the area, as heat and VOCs (Volatile Organic Compounds) will rise.

Try to position the fan in the middle of the pressure system (Ensure equal pressure resistance in front of and behind the fan). Make sure that your light ballasts are outside the growing area. Use as little ducting as you can. Insulate your ceiling if you can. Use waterjackets such as the HydroJacket tm if you can.

Inlet Fans - should you use one?

We recommend using an open inlet rather than an inlet fan. In an open inlet situation, the exhaust fan is able to draw air into the growing area relatively easily. This generally requires an inlet at least 6 times larger than the fan. We only recommend using an inlet fan if absolutely necessary to reduce the load on the motor and/or blades of the main exhaust fan. This is because open inlet systems are more efficient per additional watt (better to have one fan running at 80% efficiency than two fans running at 85% efficiency with only one of them exhausting). More importantly, only open inlet systems ensure that stale air is not recycled within the grow room and that heat is exhausted as efficiently as possible. If you do have to use an inlet fan, select one with a very similar airflow to the exhaust fan (after allowing for the resistance of dusting and filter).

Some growers prefer a marginally higher inlet pressure as this pressurizes the room. However there is no benefit to this in plant physiology. A 'whirlygig' exhaust will assist the exhaust fan. Check whether there is insufficient air inlet by opening a door and listening closely for a change in the pitch of the fan, and/or feeling the fan for increased airflow.

Remember that air will follow the easiest passage and that your goal is to have considerable air movement through the foliage without inducing stress. One very happy grower solves this problem by using perforated storm water drainpipe as an inlet, lain beneath the plants between Turbo Tanks®.

Quick Guide:

Plants 'breathe in' CO_2 from the air just as we breathe in oxygen. Make sure that clean fresh air is always going through the canopy of the plants, especially in the corners of the room. The easiest way to confirm this is to see that the plants are gently moving during light hours.

Maintenance

MountainAir® filters require little or no maintenance if run within specifications; in particular with an exhaust humidity of less than 80%. A humidistat positioned near the exhaust will confirm this condition. Anti-dust socks are available from all MountainAir® distributors to suit the filters. Made from a specialist fabric, these are hand and machine washable. Using an anti-dust sock leads to an extended filter life, with a small increase in resistance within the system. Two sizes of anti-dust sock are available for each filter size: one size sits inside the filter, the other around the filter. In both cases, the air passes through the anti-dust sock before it passes through the carbon. The anti-dust sock is necessary in dusty environments, i.e. a fan drawing air from underneath a house. However, some users remove the fitted dust sock and still obtain a filter lifespan of three years or more.

If your filter does become blocked, try this: gently tap it all around the outside, then remove or replace the anti-dust sock, then apply a vacuum cleaner or air compressor to the outside, then reverse the fan, then repeat this process, this time concentrating on the inside of the filter. If the exhaust humidity is too high, the carbon will preferentially adsorb water from the air. Dry the filter by placing it in dry sunlight every day for three days.

Quick Guide:

Operate the filter within our specifications (see 'Specifications') and you can forget about it.

Noise Reduction

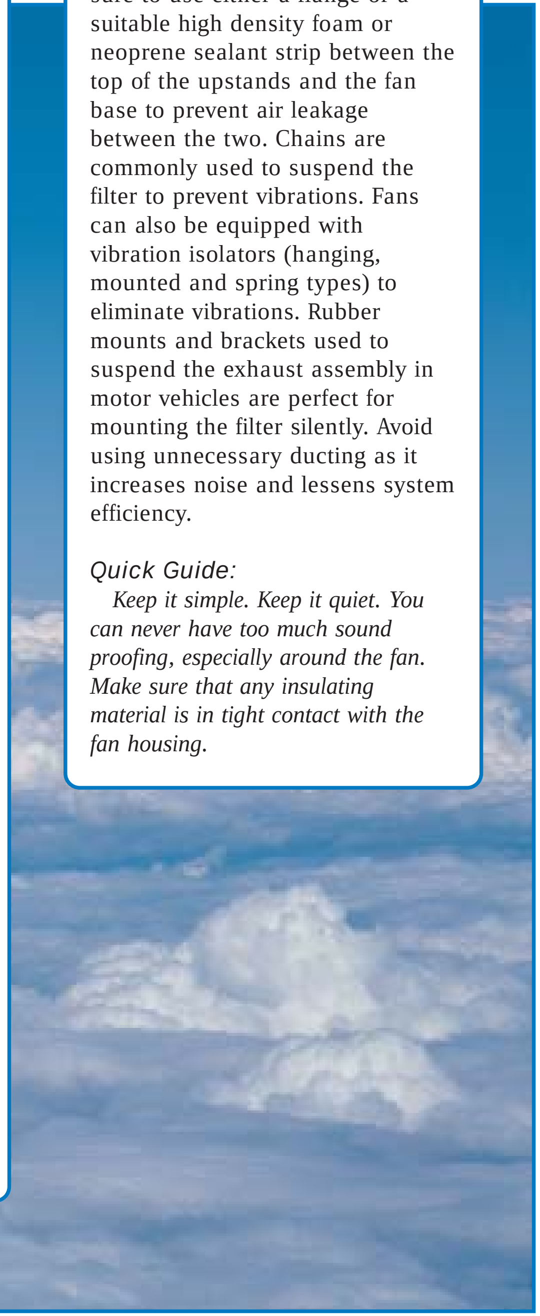
To minimize noise, select the right equipment, configure, and install it correctly. Different fan manufacturers use at least three different methods of measuring noise output, leading to confusing data. When choosing a fan, be sure to compare like with like. Orthodox decibel testing is done at 3 meters distance.

The filter itself will muffle the noise of the fan surprising well. However, you may wish to improve things further. One method is to place the fan inside a plastic drum, packed with an acoustically insulating material such as AC rated 'pinkbatts' or wool. Some customers custom-build wooden boxes for the same purpose. Acoustically Insulated ducting and silencing attenuators will reduce noise from exhaust systems. Acoustic ducting can be used throughout, or in short joining sections to harmonically isolate filters and fans (we recommend 8" to 10" lengths for this). Whereas mechanical noise must be deadened, vibratory noise can be designed around. Set-up in the coolest place you can find (where your dog likes to rest on a hot day): you may get away with a slightly quieter fan. A whirlygig on the roof to assist the exhaust fan may accomplish the same thing. Custom rubber flanges are available to mount fans without vibration.

If you are roof mounting a fan, be sure to use either a flange or a suitable high density foam or neoprene sealant strip between the top of the upstands and the fan base to prevent air leakage between the two. Chains are commonly used to suspend the filter to prevent vibrations. Fans can also be equipped with vibration isolators (hanging, mounted and spring types) to eliminate vibrations. Rubber mounts and brackets used to suspend the exhaust assembly in motor vehicles are perfect for mounting the filter silently. Avoid using unnecessary ducting as it increases noise and lessens system efficiency.

Quick Guide:

Keep it simple. Keep it quiet. You can never have too much sound proofing, especially around the fan. Make sure that any insulating material is in tight contact with the fan housing.



Complete Compaction & Vibration Compaction

Quick Guide:

Simple vibration, complex vibration, MountainAir® compaction.

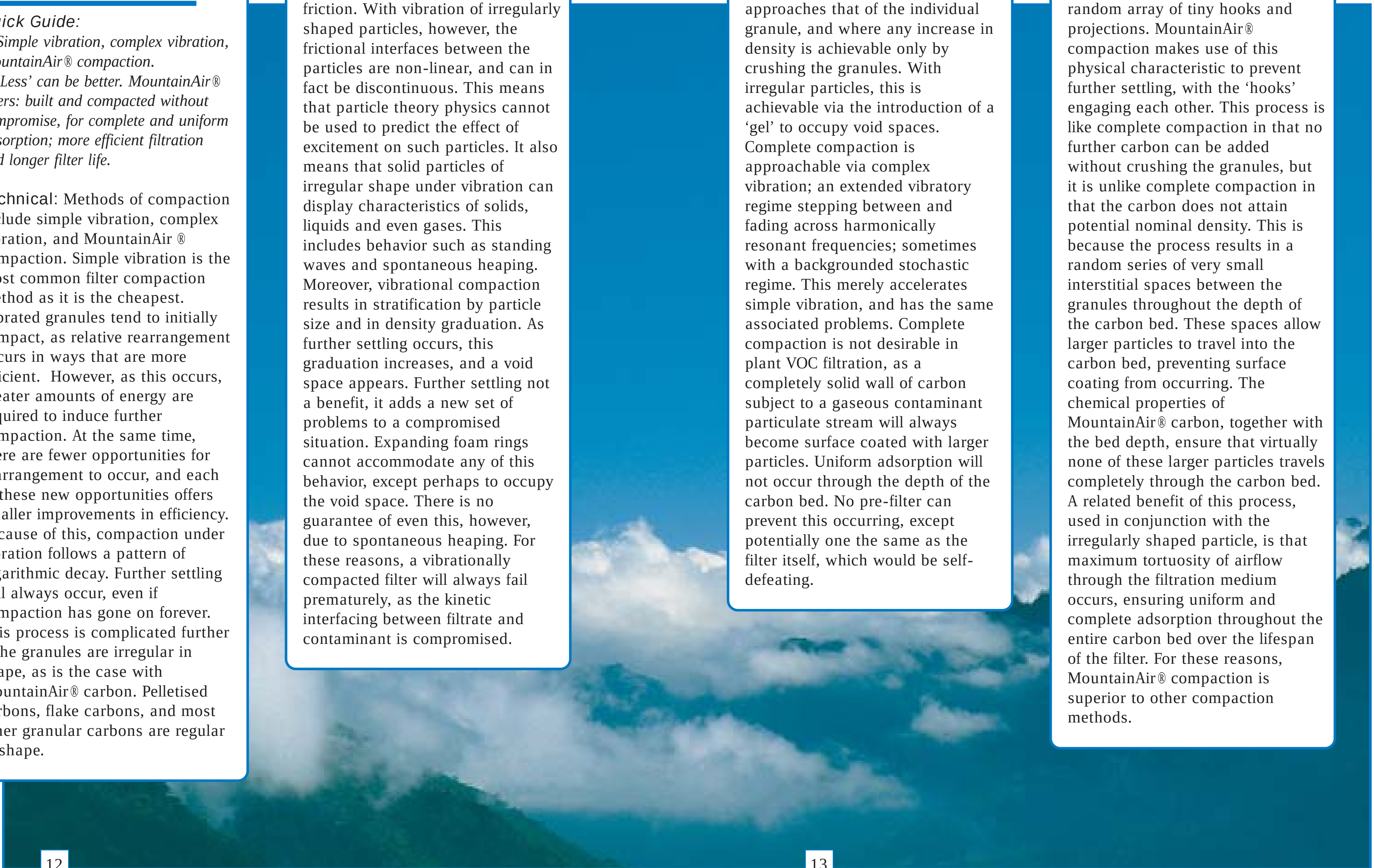
'Less' can be better. MountainAir® filters: built and compacted without compromise, for complete and uniform adsorption; more efficient filtration and longer filter life.

Technical: Methods of compaction include simple vibration, complex vibration, and MountainAir ® compaction. Simple vibration is the most common filter compaction method as it is the cheapest. Vibrated granules tend to initially compact, as relative rearrangement occurs in ways that are more efficient. However, as this occurs, greater amounts of energy are required to induce further compaction. At the same time, there are fewer opportunities for rearrangement to occur, and each of these new opportunities offers smaller improvements in efficiency. Because of this, compaction under vibration follows a pattern of logarithmic decay. Further settling will always occur, even if compaction has gone on forever. This process is complicated further if the granules are irregular in shape, as is the case with MountainAir® carbon. Pelletised carbons, flake carbons, and most other granular carbons are regular in shape.

When particles that are regular in shape are vibrated, gravity is the predominant acting force, less friction. With vibration of irregularly shaped particles, however, the frictional interfaces between the particles are non-linear, and can in fact be discontinuous. This means that particle theory physics cannot be used to predict the effect of excitement on such particles. It also means that solid particles of irregular shape under vibration can display characteristics of solids, liquids and even gases. This includes behavior such as standing waves and spontaneous heaping. Moreover, vibrational compaction results in stratification by particle size and in density graduation. As further settling occurs, this graduation increases, and a void space appears. Further settling not a benefit, it adds a new set of problems to a compromised situation. Expanding foam rings cannot accommodate any of this behavior, except perhaps to occupy the void space. There is no guarantee of even this, however, due to spontaneous heaping. For these reasons, a vibrationally compacted filter will always fail prematurely, as the kinetic interfacing between filtrate and contaminant is compromised.

Complete compaction means compaction to a point where the density of the massed material approaches that of the individual granule, and where any increase in density is achievable only by crushing the granules. With irregular particles, this is achievable via the introduction of a 'gel' to occupy void spaces. Complete compaction is approachable via complex vibration; an extended vibratory regime stepping between and fading across harmonically resonant frequencies; sometimes with a backgrounded stochastic regime. This merely accelerates simple vibration, and has the same associated problems. Complete compaction is not desirable in plant VOC filtration, as a completely solid wall of carbon subject to a gaseous contaminant particulate stream will always become surface coated with larger particles. Uniform adsorption will not occur through the depth of the carbon bed. No pre-filter can prevent this occurring, except potentially one the same as the filter itself, which would be self-defeating.

MountainAir® compaction: Under magnification, the surface of a MountainAir® granule consists of a random array of tiny hooks and projections. MountainAir® compaction makes use of this physical characteristic to prevent further settling, with the 'hooks' engaging each other. This process is like complete compaction in that no further carbon can be added without crushing the granules, but it is unlike complete compaction in that the carbon does not attain potential nominal density. This is because the process results in a random series of very small interstitial spaces between the granules throughout the depth of the carbon bed. These spaces allow larger particles to travel into the carbon bed, preventing surface coating from occurring. The chemical properties of MountainAir® carbon, together with the bed depth, ensure that virtually none of these larger particles travels completely through the carbon bed. A related benefit of this process, used in conjunction with the irregularly shaped particle, is that maximum tortuosity of airflow through the filtration medium occurs, ensuring uniform and complete adsorption throughout the entire carbon bed over the lifespan of the filter. For these reasons, MountainAir® compaction is superior to other compaction methods.



Airflow

Technical: MountainAir® filters have initial airflows that are generally superior to other filters. This is due to the very low density of MountainAir® carbon, coupled with a relatively high carbon mechanical strength, which supports a greater level of activation without friability. Equally importantly, the airflow of MountainAir® filters declines at a slower rate than do filters made with other carbons, due to decarboxylation (see 'MountainAir® carbon'). Because larger plant VOCs are partially broken down prior to adsorption, the pores of MountainAir® carbon do not become blocked as quickly. In other carbons, there is a simple tradeoff between airflow and the quality and longevity of filtration, as the carbon bed provides both the filtration and the resistance to airflow. The accurate measurement of airflow is surprisingly complicated, while industry reporting of airflow data are notoriously suspect. Airflow can be measured and presented in numerous ways.

Some manufacturers either use crude testing equipment that cannot provide a margin of error, or simply invent data. We have developed an airflow-testing rig, which we believe improves on the current Australian Standard for ventilation airflow testing. We have introduced to Australian Standard # AS29 112 a more efficient baffle and endplate that lessens calibration error, and a second compensatory fan, which has the effect of compensating for the error introduced by the need to compensate for inherent system drag. We conduct all of our airflow testing in a consistent manner using this world's best apparatus, and interpreted and present the data in a conservative manner, to ensure that our customers have a realistic and accurate expectation of airflow performance. At MountainAir®, we not only meet industry standards, we set them.

Quick Guide:

MountainAir® filters have a very long effective airflow life. We have taken down several MountainAir ® filters which were running fine after more than three years ând up to five years in continual flowering rooms yielding 0.9+ grams (dried) per watt every 49 days per cycle – with no anti-dust sock – and had to scrub both sides of the steel mesh with a wire brush in order to see through the mesh.

Filter Design

Technical: Some carbon filter manufacturers use gimmicks of all kinds to try to attract your attention. One manufacturer provides a conical inner base, claiming that this improves airflow. However, it does not improve airflow. It is a gimmick, useless to man or beast. As air from a centrifugal or mixed flow type fan enters the filter, it does not travel in a vector (or straight line). It travels away from the outside of the fan housing, at an obtuse angle. This airflow mass is yawing and leaves a low-pressure area in the motor shadow. Introducing straight ducting, vaning or baffling to straighten the air also slows the air, and leads to a zero sum gain. In any case, there is a pressure gradient within the filter as air leaves the filter. This is because the filter is flow dependent and not pressure dependent. So in reality, the airflow mass tends to strike the side of the filter, with some air exiting and other air travelling further down before either re-striking the filter wall or exiting through the carbon bed.

A conical base offers no benefit when air is travelling out through the neck of the filter, and – if air is travelling into the filter through the neck of the filter – it may in fact lead to a drag trap forming as the filter ages. For this reason, it is not used in any other filter, including in the automotive industry, which has a very great research and development expenditure. It is not a registered design and yet it has not been copied. Other gimmicks to be aware of include the wrapping of filters in plastic. The intended implication of this is that the carbon would otherwise absorb moisture from the air. However, this is simply not true. We have experience of activated carbon stored in open warehouse piles for fifteen years that had not deteriorated either chemically or physically. At MountainAir®, we box our filters properly, but we decline to wrap them in plastic, as it offers no benefit.

Quick Guide:

MountainAir® filters are manufactured without gimmicks or compromise.

MountainAir® Activated Carbon - the oldest and best

Technical: Do not be fooled by claims that total surface area: mass ratios are an absolute measure of any carbon's suitability for a particular application. There are many other equally important factors to consider. For example, an air filter works in a sieving action. If pore size distribution is unsuited, the 'sieve' blocks up rapidly. If the density or granular characteristics are unsuited, insufficient airflow will occur.

MountainAir® carbon is derived from an allocthonous, sub-bituminous black coal deposited in the Devonian Period in a Pre-Cambrian formation within the Collie Basin over 230 million years ago. It is the planet's oldest coal. It has extremely low ash content. Trace element discrimination demonstrates it to be physically and chemically unique.

This feedstock is steam activated in the presence of large concentrations of particular gases that affect the activation process in a certain way. The result is an irregularly shaped activated carbon granule predominated by mesopores in a physical distribution which is absolutely ideal for adsorption of volatile organic compounds as well as other associated odorous particles.

MountainAir® carbon displays a property known as decarboxylation, by which the carbon uses ambient hydrogen to strip carboxyl groups away from larger VOCs prior to absorption. In effect, the carbon acts as its own pre-filter. No other carbon in the world (we have tested eight other carbons types) is known to decarboxylate. This property partly explains the phenomenal longevity of MountainAir® filters.

It's not just that the total porous surface area of a MountainAir® 0640 filter is greater than that of three thousand football fields. It's the fact that because more of this surface area is available for adsorption, the rate of adsorption kinetics is so much faster, due to the unique chemistry; the granular size and irregular shape, and the mechanical hardness and density of the carbon.

MountainAir® filters will remove most VOCs of less than 30 microns, including acetone & acetate compounds, alcohol compounds (butyl base, ethyl base, methyl base & propyl base), animal odors, benzene compounds, cooking odors (low humidity), diesel fumes, epoxy resin odors, glue odours, paint odors, all plant odors, pollens, some poisons, odour-bearing smoke particles, and most welding fumes. MountainAir® filters are less efficient at removing large smoke particles but are extremely efficient at preventing and/or minimising smoke damage to fabrics et cetera.