

# PERMANENT SUSPENSION MODULES

## GENERAL DESCRIPTION

These filters are manufactured for ease of installation and incorporation into ducted air systems. They can be used on both supply for purifying incoming air, and can be used on the extract to remove toxic gasses and odours generated within a process.

## Construction

The modules are manufactured by mounting a series of panel filters within a sealed case. The airflow is optimized by presenting the filtering surfaces in a "V" formation.

Each panel is sealed into the filter case so as to ensure no air can bypass the bonded granules.

The panels are manufactured using long established bonding techniques which hold the granules in a rigid biscuit. The biscuit is encapsulated in a carbon impregnated cloth which prevents any leakage of granules or powder.

The unique bonding method used by Purified Air ensures that the panels will remain intact and rigid even if wet.

## Available with Mixed Media, 207c Carbon or Stock Grades of Carbon

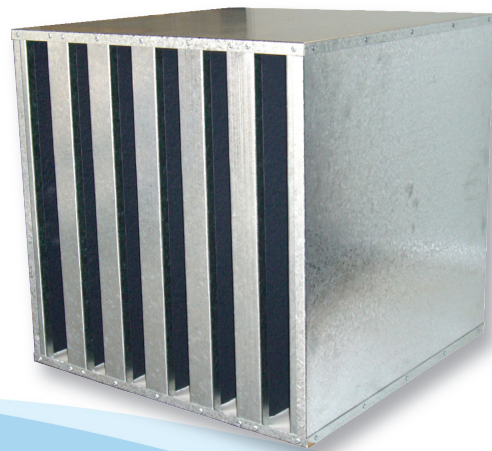
208 - Good general Carbon grade suitable for many applications

209 - Copper Coated Carbon for use in Museums and archives

KI - For enhanced garlic odour removal

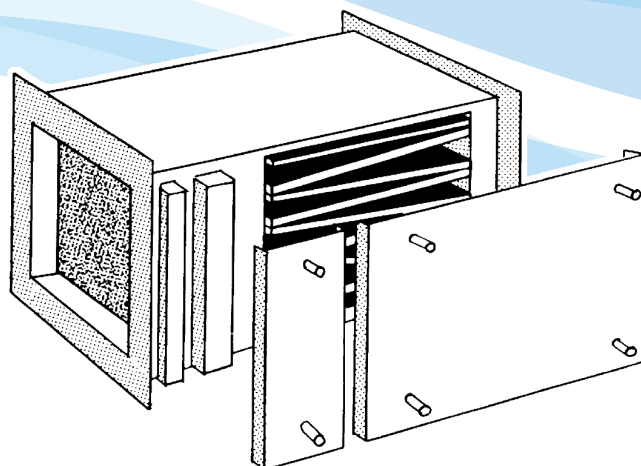
## Typical Applications include:

- Elimination of Cooking Odours
- Removal of Kerosene Exhaust Fumes
- General Odour Removal
- Smoke Removal
- Neutralisation of Ammonia and its Derivatives
- Removal of Formaldehyde
- Removal of Airborne Pollutants and Contaminants
- Removal of Acid Gases



## OTHER PRODUCTS IN OUR RANGE INCLUDE

- Bag Filters
- Disposable Panels
- Washable Panels
- Grease Filters
- Grease Filter Casings
- Cleaning Products
- Pad Frames
- Filter Media
- Pad Holding Frames
- Absolute (HEPA) Filters
- Front & Side Access
- Frames & Casings

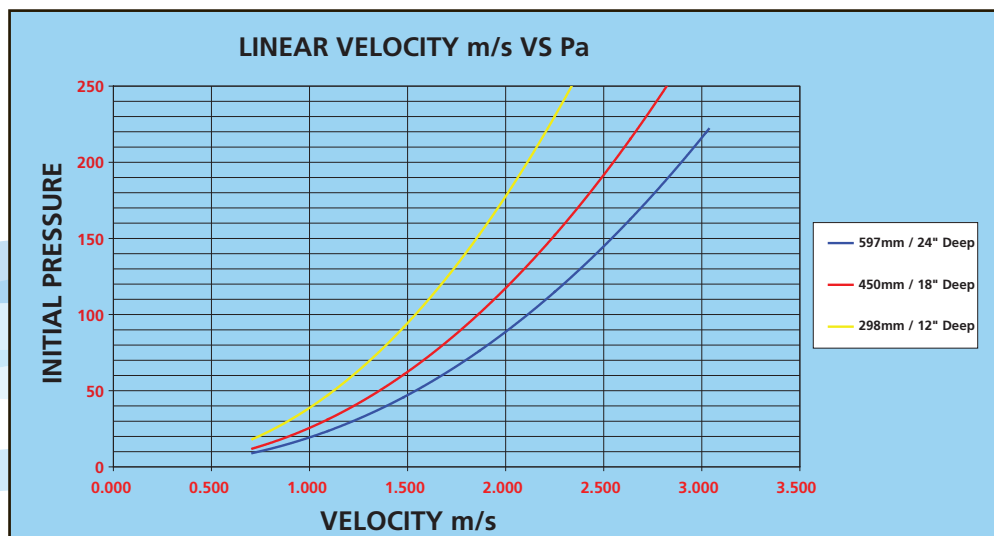


# Mixed Media / Carbon Filter

## STANDARD SIZES

No.	Nominal Size (Inches)	Height (mm)	Width (mm)	Depth (mm)	Weight of Carbon (Kg)	Cell Weight (Kg)	Capacity @ 0.1 Second Dwell Time m <sup>3</sup> /s
PA-CF1-7C	24 x 24 x 8	594	594	197	10	22	800
PA-CF1-HALF-7C	24 x 12 x 8	594	291	197	5	11	400
PA-242412/8-7C	24 x 24 x 12	594	594	292	13	24	990
PA-121212-7C	12 x 12 x 12	297	297	297	6	12	450
PA-181812-7C	18 x 18 x 12	445	445	297	13	25	990
PA-241212-7C	24 x 12 x 12	594	297	297	13	25	990
PA-242412-7C	24 x 24 x 12	594	594	297	25	36	1900
PA-CF2-7C	24 x 24 x 16	594	594	397	18	34	1370
PA-CF2-HALF-7C	24 x 12 x 16	594	291	397	9	18	685
PA-WA15-208	24 x 6 x 18	144	600	440	7	13	533
PA-121218-7C	12 x 12 x 18	292	292	451	10	15	761
PA-181818-7C	18 x 18 x 18	445	445	451	19	26	1445
PA-241218-7C	24 x 12 x 18	594	297	451	18	26	1369
PA-242418-7C	24 x 24 x 18	594	594	451	36	52	2740
PA-121224-7C	12 x 12 x 24	292	292	597	13	19	990
PA-181824-7C	18 x 18 x 24	445	445	597	25	36	1900
PA-241224-7C	24 x 12 x 24	594	297	597	25	36	1900
PA-242424-7C	24 x 24 x 24	594	594	597	50	61	3800

Note: - Linear Velocity = Volume (m<sup>3</sup>/s) ÷ Filter Cross Sectional Area



Take your design airflow and select a filter or combination of filters from above for 0.1 seconds dwell time. For greater dwell times divide your airflow by 2 for 0.2 seconds by 3 for 0.3 seconds and so on and reselect the filters.

For increased dwell times filters can be used in series or parallel, when used in parallel pressure drop decreases and in series it increases.

# MIXED MEDIA & CARBON FILTER SOLUTIONS

## ACTIVATED CARBON

Activated carbon has been utilised for many years to reduce fumes and gases from the air. Currently, a wide range of carbons is available for this purpose in the continuous battle against the emission of unpleasant or even dangerous odours and fumes from a wide variety of sources. The ever-increasing awareness of this problem by public health authorities and environmentalists has resulted in a corresponding increase in the use of activated carbon filters.

The type of carbon most commonly used in the H & V Industry is grade 207C. A large variety of other activated carbons are available some of which are specially impregnated for particular applications.

## APPLICATIONS

Media adsorption filters are desirable in many installations where airborne odours, chemical or toxic fumes are present and need to be reduced or eliminated. The carbon and other medias will adsorb the chemical molecules in the airstream in varying degrees according to the particular contaminants involved and the type of filter material utilised. It may be interesting to note that, when activated, one gram of carbon can have a surface area of approximately 1000 sq.m.

Incoming air at city offices, industrial plants, airports, art galleries, museums etc., can be purified by passing it through carbon units fitted in the system. Also air from kitchens, industrial processes, sewage plants etc., can be extracted through activated carbon before entering the atmosphere, greatly reducing its impact on the environment and enabling it to comply with pollution regulations or focal authority requirements.

## PERMANENT SUSPENSION

Activated carbon and other media in loose form can present problems in any installation since there is a tendency for the granules to move against each other causing bedding down, which produces dust and can also allow by-pass to take place. However, permanent suspension panels that are utilised throughout our range have the granules held together by a patented bonding process, and incorporate a non-woven fabric on both faces. This construction eliminates the problems described above, and produces a homogeneous biscuit of consistent quality with dimensional stability, thus producing an even resistance across the panel.

## DESIGN CRITERIA

In order that a media filter may operate satisfactorily certain criteria have to be met which do not apply to particulate filters. The most important aspect is the dwell time (i.e. the period of time the air is in contact with the media) which in many applications is recommended to be at least 0.1 seconds. This equates to a face velocity of 38 fpm

(0.19 g m/s) when using a standard 1" (25mm) nominal thickness panel. However, the dwell time can vary with different applications and in some cases needs to be considerably increased. As can be seen from the face velocity quoted above, a much larger panel area is required for a given air volume than is needed for a particulate filter. For this reason carbon / mixed media cells, rather than panels, are nearly always required in order to maintain a reasonable duct size in relation to the air volume being handled. The cells contain a number of panels in 'V' formation to give an extended surface area.

As far as possible water vapour should be removed from the airstream to eliminate possible condensation within the filter that could cause porous blockage and possible breakdown of the biscuit. Porous blockage will tend to nullify the adsorption effect and cause a dramatic increase in air resistance (this also applies to media in loose form). However, conditions as high as 80% RH are normally acceptable provided no interstitial condensation takes place.

Airstream temperatures entering the filter in excess of 40C (104F) should be avoided if possible. If temperatures in excess of this figure are anticipated, steps should be taken to reduce the temperature to an acceptable level e.g. with fresh air bleed, cooling coil or heat exchanger, to prevent any regeneration taking place.

#### **NOTES ON USE AND SELECTION OF MEDIA PANELS AND UNITS**

- (a) Permanent suspension panels are normally supplied fitted with an aluminium frame and can be made to any reasonable size to replace existing panels of all makes.
- (b) As a guide, a 1" nominal thickness panel should be selected to have a window velocity not exceeding 38 fpm (0.19 m/s) i.e. a 24" x 24" x 1" nominal panel will handle up to 132cfm (0.06m/s).
- (c) Some processes give off large amounts of smoke, which is extremely detrimental if allowed to reach the media filters. In many cases this can be overcome by the use of a good quality pre-filter. This will also protect the media from particulates that will block the microporous structure and prevent adsorption taking place.
- (d) Modules can be 'tailor-made' to any reasonable size to fit ducting, air-handling units etc.

#### **PRE-FILTERS**

Since carbon and other media filters remove odours by adsorption, any build-up of dirt or grease on the filter face will result in the blanking or encapsulation of the open porous structure and will inhibit or totally destroy the process.

It is therefore essential that a suitable pre-filter is provided to protect the media filters, and this should be of the highest grade economically viable.

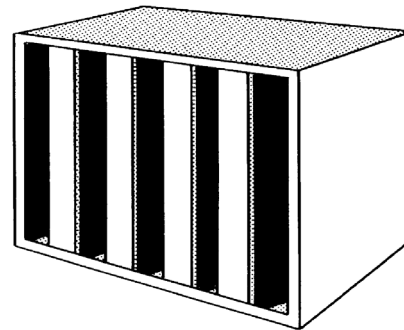
The pre-filter would normally be a panel or bag with a minimum performance of EU3 to Eurovent 4/5 (although an absolute or electrostatic filter may be required in some applications). We do not consider a glass panel to be suitable.

In kitchen extract or similar applications where grease is present, a high efficiency or electrostatic filter should be fitted before the media system, which should be as far as possible from the air inlet. All pre-filters should be checked regularly and replaced if necessary.

**NOTE:** We cannot stress sufficiently that every effort should be made to ensure that grease and smoke particles are prevented from reaching media filters.

**METAL CASED ‘MODULES’**

The metal cased ‘Module’ cells have the highest possible loading with heavy duty panels permanently sealed into a galvanised sheet steel casing. This construction gives a very strong unit capable of handling large air volumes, or where conditions dictate, increased contact time. The advantage of this unit is that with the panels sealed in, there is no possibility of air leakage within the cell.



Also, these units can be manufactured to almost any reasonable size, the limiting factors being overall weight for handling purposes, and the size of individual panels. They can therefore be ‘tailor-made’ to fit air handling unit’s etc. When the unit has finished its useful life it is discarded and replaced with a complete new cell.

Where points of discharge from extract systems are in critical locations with regard to surrounding buildings, consideration should be given to increasing dwell time accordingly.

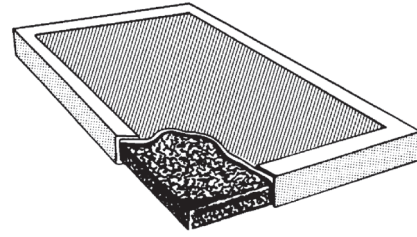
Notes: Modules should be installed with panels vertical. For larger air volumes multiple cells should be used. ‘Modules’ with reduced carbon weights can be provided to match the carbon content of other manufacturers units where required. Non-standard sizes: These units can be manufactured to any reasonable size to suit individual requirements.

**Module selection data**

Application	Capacity
Canteens, normal kitchens and restaurants.	0.1 second dwell time
Kitchens producing large amounts of fried foods or concentrated cooking of burgers.	0.2 seconds dwell time.
Indian restaurants etc.(i.e. curry, spices etc.)	0.2 to 0.4 seconds dwell time.
Excess of onions or garlic smells from cooking	0.2 to 0.4 seconds dwell time
General air conditioning	0.075 to 0.1 seconds dwell time
Specialised applications (chemicals, etc.)	Refer to PA. Obtain concentrations and chemical details (formulae) where possible

## CARBON PANELS

Our unique patented bonding system produces carbon biscuits of consistent quality which are dimensionally stable and dust free. The biscuits incorporate a non-woven fabric on both faces and all edges, are normally supplied fitted into an aluminium channel frame.



Galvanised or stainless steel frames can be provided if required, or the biscuit can be supplied unframed. These panels can be manufactured to any reasonable size and in a range of densities and thickness'.

## SIDE ACCESS CASINGS ('MODULES')

Side access casings to house 'Modules' are available for single or multiple cell applications, with access on one or both sides as required.

For single cell installations, the casing consists of a galvanised sheet steel casing with either sheet or proprietary type flanges. E.g. -MEZZ' or 'Ductmate'.

The cell sits against an angle frame within the casing, which is fitted with a neoprene seal. An additional frame at the inlet to the filter has jacking bolts to push and hold the 'Module' against the seal. Pre-filter slides are also provided where required. For multiple cell installations we recommend that, due to the weight of the 'Modules', a heavier construction casing is provided. Our standard multiple unit consists of 1.5mm GSS casing with a standard mez type flanging system on each end. Flanges are: 20mm, 30mm or 40mm depending on size of unit all built to DW144 with a 3mm thick rigid shelf welded to the casing. This gives a very rigid internal structure which avoids distortion of the casing.

The shelf is provided with 'jacking' bolts to push the 'Module' against the sealed frame on the outlet. Pre-filter slides are provided when required. On multiple cell casings separate access doors for the 'Module' and pre-filters are normally provided.

