

## 化学滤网系列 Chemical Air Filters

### 包覆式活性炭滤网 (AR504)

标准尺寸厚度6吋、12吋，外框材质为金属框。滤材型式分为万用型、除酸型、除硷型三种，去除挥发性有机物、一般室外污染源、酸类及氨及胺类。可用于半导体产业及高精密电子产业。特性为低发尘量及低压损，适用于空调箱及机台设备端。

### Carbon Load Web Type Activated Carbon Air Filter (Cat. #AR 504)

Standard Thickness is in 6" and 12", frame material is metal. Typical Media is including of 853, 875 & 147 types. Activated carbon can effectively remove chemicals from air, including organic volatile chemicals, acid chemicals, alkaline chemicals or any hazardous materials. With lower dust emission and lower pressure drop features, this product is specially suitable for Semiconductor Plant and Electronics Factory.



### 包覆式活性炭滤网

### Carbon Load Web Type Activated Carbon Air Filter

· 选用要则：针对不同的化学气体，可选用不同的滤材型式，以达到最好的处理效果。

1. 针对所要过滤的污染物选择适当的吸附剂材料
2. 去除效率高
3. 低压损以降低风机的负载
4. 低发尘量
5. 低挥发性气体
6. 便于安装要求质轻
7. 针对要求的效率下去除容量要大即寿命长，以减少更换次数也确保制程环境的洁净度

Various media types are available for different chemicals selection to achieve the best efficiency.

1. According to pollutions to select appropriate absorbent material.
2. High Removal Efficiency.
3. Lower Pressure Drop for reducing blower's load.
4. Lower Dust Emission
5. Low Volatile Gases
6. Easy of installation and with light weight.
7. Reduce the number of replacement times, ensure the cleanliness of process environment.
8. Longer Life Span.



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· 滤材(Media):

型式 Type	说明 Description		
滤材 Media	去除挥发性有机物 853(2750) Remove VOCS	去除氨及胺类 147(2752) Remove ammonia and amines	去除酸类 875(2751) Remove Acid
滤材厚度 (mm) Media Thickness	2.2	2.2	2.2
基重 (g/m2) Basis Weight	600	600	600
使用指导 Using Guidance	硼 Boron	NMP	酸 Acid
	臭氧 Ozone	HMDS	硫酸 H2SO4
	硫化氢 H2S	氨 Ammonia	臭氧 Ozone
	二氧化硫 SO2	胺类 Amines	氯化氢 HCL
	二氧化氮 NO2	Monoethylamine	氟化氢 HF
	油漆味 Paint Odor	Morpholine	硫化氢 H2S
	挥发性有机物 VOC	Cyclohexylamine	二氧化硫 SO2
	食品香味 Food Aromas	Dimethylamine	二氧化氮 NO2
	一般室外污染物 Commo Outdoor Pollutants	Trimethylamine	挥发性有机物 VOC
	烟味 Tobacco Smoke Odors	Diethylamine	
		动物气味 Animal Odor	
	浴室气味 Bathroom Smells		

\*853 (2750) 滤材 - 去除挥发性有机物、二氧化硫、二氧化氮、臭氧、硫化氢。此滤材为最有效去除挥发性有机物的滤材, 同时它对一般室外的污染物有相当可观的容量, 如二氧化硫、二氧化氮、臭氧、硫化氢。此滤材对于去除硼也非常有效 (例如: 常用的HEPA及 ULPA滤网)。

\*147 (2752) 滤材 - 用于去除氨及胺类(含有氮的有机化合物, 如NMP, monoethylamine, morpholine, cyclohexylamine, dimethylamine, trimethylamine, diethylamine, HMDS 等)

\*875 (2751) 滤材 - 对除二氧化硫、二氧化氮、臭氧、硫化氢也非常有效。【比853 (2750) 滤材效果还好】。

\*147 (2752) 及875 (2751) 两种滤材都可以去除挥发性有机物。然而, 使用寿命与853 (2750) 滤材相较减少了一半。

\*853(2750) – Used for removing VOCS, SO2, NO2, ozone, H2S. The 853 media is most effective for VOCS, and it has considerable capacity for common outdoor pollutants such as SO2, NO2, ozone, H2S. The 853 media is also very effective for removing boron (e.g., emission from conventional HEPA/ULPA filters)

\*147(2752) – Used for removing ammonia and amines (nitrogen-containing organic compounds such as NMP, monoethylamine, morpholine, cyclohexylamine, dimethylamine, trimethylamine, diethylamine, HMDS and etc.)

\*875(2751) Media - Used to remove acids such as HCl, HF, H2SO4, and is also very effective for removing SO2, NO2, ozone, H2S. This medial is better than 853 media.

\*Both 147 and 875 media can remove VOCS. However, the life span of 147 media is reduced to 1/2 as compared to 853 media.

- 外框：框材可选用纸框、镀锌铁框或不锈钢框。
- 外框设计：箱型, 单法兰, 双法兰。

· Frame:

5-7/8" & 11-1/2" thickness is available for Aluminum, Galvanized steel and Stainless Steel.

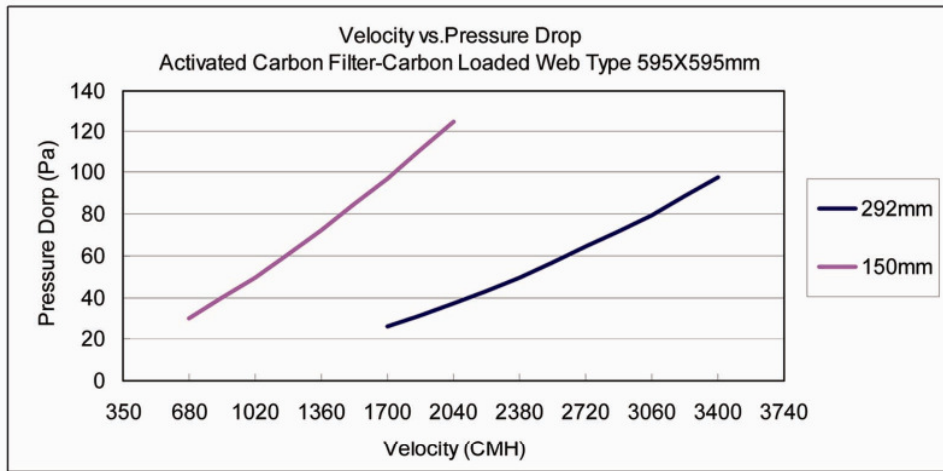
2" & 4" thickness is available for Paper, Aluminum, Galvanized Steel and Stainless Steel.

- Header Design: Box Type, Single/Double Header.

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执行变量 Performance Parameter	植入性滤网 Carbon Slurry Coated Type Activated Carbon Filter	填充式滤网 Tray Type Activated Carbon Filter	蜂巢式滤网 Honey-Comb Type Activated Carbon Filter	包覆式滤网 Carbon Loaded Web Type Activated Carbon Filter
低压损 Low Pressure Drop	+	+ or -	+ or -	+
活性炭重量 Weight of Activated Carbon	-	++	++	+++
最理想的活性炭尺寸 Optimal Activated Carbon Size	+	-	+	++++
整体吸附效率 Overall Adsorption Efficiency	---	+	+	+++
低灰尘 Low Dust	+	--	-	++
压褶能力 Pleated Ability	+	N/A	N/A	++++
更换筒易 Easy of Replacement	+	--	+	+

风量关系曲线图



活性炭滤网性能表 Activated Carbon Filter Performance Data

通称尺寸 Nominal Size (W*H*D) (inch)	实际尺寸 Actual Size (W*H*D) (mm)	额定风量 Rated Capacity (CMH)	初压损 Initial Resistance (Pa)	去除效率 Remove Efficiency (%)
12*24*6	289*595*150	1700	100	依现场条件而定 Depending on field condition
20*24*6	492*595*150	1425		
24*24*6	595*595*150	3400		
12*24*12	289*595*292	1700	87	
20*24*12	492*595*292	2850		
24*24*12	595*595*292	3400		

\* Special Sizes are available upon request.

※特殊规格可生产制造。



专营空气滤网及无尘室设备服务

Services of Filters for Cleanroom and HVAC System

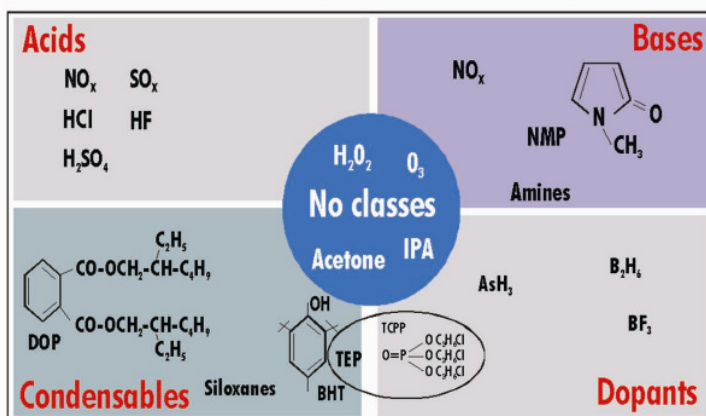
## 材质和使用条件 Material and Service Conditions

型式 Type		说明 Description
总成 Construction	滤材 Filter Media	不织布包覆活性炭粒 Non-Woven + Activated Carbon
	外框材质 Frame Material	金属框 Metal Frame
	外框型式 Frame Type	箱型 Box Type, Single/Double Header Type
	支撑材 Support Grid	隔板 Separator
	密封胶 Sealant	PU BASE
	垫片材质 Packing Material	新平橡胶 Neoprene Rubber

- 控制臭味和气体污染之的四种方式：防毒面具、燃烧、通风与移除。  
Four main techniques for controlling odor and gas contaminants: Gas Mask, Combustion, Ventilation and Removal.
- 颗粒状滤材用来控制气体污染物有两种方式：吸附与氧化。  
Granular Media is used for controlling gas contaminants by Adsorption and Oxidation.
- 化学滤网以吸附与吸着原理来移除气体污染物分子。  
Chemical Filter can be used to remove molecular contaminants by Adsorption and Oxidation.
- 吸附：当气体或液体分子碰到吸附体表面被抓着且无发生化学反应。  
Adsorption: When gaseous or liquid molecules reach adsorbent surface but without any chemical reaction, the phenomenon is called physical adsorption or physisorption.
- 吸着：当气体或液体分子碰到吸附体表面被抓着且发生化学反应。  
Sorption: When gaseous or liquid molecules reach adsorbent surface and happen chemical reaction, the phenomenon is called Sorption.
- 被吸附物质的沸点、蒸气压及活性是影响初效率的主要因素。一般沸点大于100℃的物质室温下的状态为液态，其蒸气较易于吸附凝结在吸附剂的表面。  
The boiling Point of adsorptive materials, vapor pressure and active are the main factor affecting the initial efficiency. The materials which boiling point higher than 100 °C, will be in the liquid state at room temperature, and is easily to be adsorbed and condensed in the adsorbent surface.
- 分子性污染物系统，最初的污染物去除效率，并非由活性炭颗粒大小、重量及活性决定。决定初效率的两个因素为吸收体及化学物的表面积。  
In molecular contaminant system, initial contaminant removal efficiency is not depending on particle weight, size, total surface area or carbon activity. Two important parameters for determining initial efficiency is the total surface area of chemicals and absorbents.
- 活性炭颗粒越细，其表面积越大。活性炭颗粒可以非常小，甚至为碳尘。此将会随气流溢散或因填充密实而产生高压损等缺点。  
The surface area increased when the dimensions of carbon are getting smaller. Particle size can be very small, even though it just becomes carbon dust. It also creates problems of escaping into the air, or due to packing tightly and causes high pressure drop.
- 不同分子量的污染物均可竞争相同的吸附表面，由于湿气会占据吸附表面。通常潮湿的天气下吸附效率会较差。温度亦会影响吸附效率，温度越高物理吸附能力越低。  
Temperature also can affect adsorption efficiency. The higher the temperature the lower the adsorption efficiency. Moisture will occupy carbon's adsorption surface, therefore adsorption efficiency is poor in wet weather (like rainy day).
- 分子量小、沸点在常温为气态的物种，因吸附剂表面无法凝结液化，不易稳定附着在吸附剂表面，容易脱离氧化或被其他分子取代。  
For Material with small molecular weight or boiling point lower than ambient temperature, they cannot condensate as liquid; thus cannot attach on the surface of adsorbent, and they will be oxidized in air or substituted by other materials on the surface of adsorbent.

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Typical Compounds of Class A, B, C, D (according to SEMI F21-95)



AMC (Airborne Molecular Contamination) 分类方法为SEMI (Semiconductor Equipment and Materials International) 组织在SEMI F21-95中对AMC气态污染物所做的分类，包括酸性(Acids)、碱性(Bases)、可凝结物(Condensables)及植入物(Dopants)，所属污染物质如下：

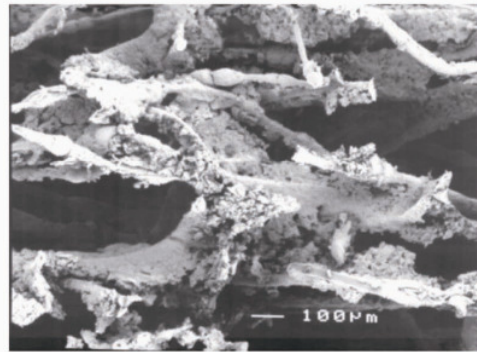
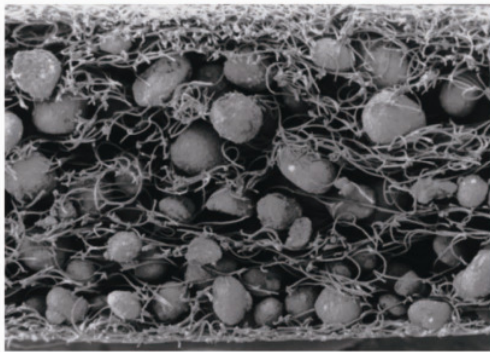
The classifying method of AMC (Airborne Molecular Contamination) is the organization of SEMI (Semiconductor Equipment and Materials International) bases on SEMI F 21-95 to classify the AMC gaseous pollutants. Gaseous pollutant is including of Acids, Bases, Condensables and Dopants.

分类 Classification	化合物 Composition
<p><b>酸</b> MA, Acids</p> <p>具腐蚀性并在化学反应中扮演接受电子，其反应的强弱依其离子化造成的氢离子浓度而定。 Corrosive gases which react chemically as acids and play a role of electron acceptor. The intensity of reaction is depending on hydrogen ion concentration.</p>	(氟氢酸) Hydrochloric Acid
	(氟氢酸) Hydrofluoric Acid
	(硝酸) Nitric Acid
	(硫酸) Sulfuric Acid
	(磷酸) Phosphoric Acid
	(醋酸) Acetic Acid
	(二氧化氮) Nitrogen Dioxide
	(二氧化硫) Sulfur Dioxide
	(氟化氢) HF
	(氯化氢) HCl
	HNO3
	H3PO4
	HBr
	<p><b>碱性</b> MA, Bases</p> <p>具腐蚀性并在化学反应中扮演供给电子。 Corrosive gases which react chemically as bases and play a role of electron donor.</p>
(NMP) N-methyl Pyrrolidione	
Amine	
HMDS	
<p><b>可凝结物</b> MC, Condensables</p> <p>污染物沸点在室温以上，且会凝结于晶圆表面者，包含有硅化物与碳氢化合物类（沸点大于或等于65.6℃）。 Condensables whose boiling point is typically above room temperature and is capable of condensing on the wafer surface.</p>	(丙酮) Acetone
	(甲苯) Toluene
	Silicone
	Hydrocarbons
	DOP
	DBP
	DEP
	BHT
<p><b>植入物</b> MD, Dopants</p> <p>污染物会造成电性改变，包含硼（通常为硼酸）、磷（通常为有机磷酸盐）及砷（通常为砷酸盐）。 Contaminants that modify the electrical properties of semiconductor material. Contaminants consist of Boron (Boric acid), Phosphorous (Organophosphate) and Arsine (Arsenate).</p>	(硼酸) Boric Acid
	(磷) Phosphorous
	(砷) Arsine
	B2H6
	BF3
	AsH3
	TEP
	TCEP
TPP	

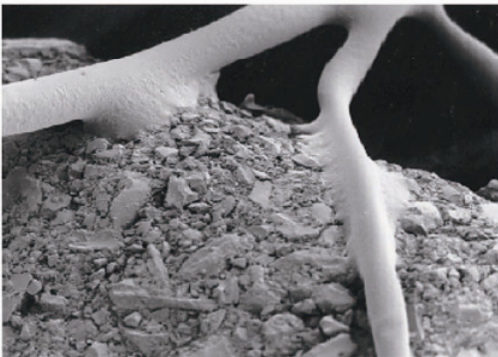


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## Carbon Slurry Coated Type vs. Novel Carbon-Loaded Nonwoven Type



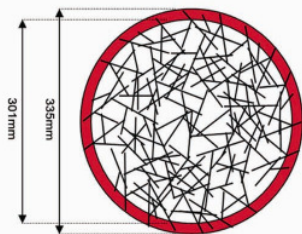
- 3-D spaced placement and immobilization of functional particles
  - Maximization of accessibility to particles
- Novel Carbon-Loaded Nonwoven Technology



500 x magnification

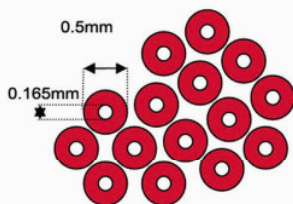
100 x magnification

- Fiber-to-fiber bonding, fiber-to-particle bonding (no adhesive)
- Minimal cover of the particle surface



6 Mesh Particle

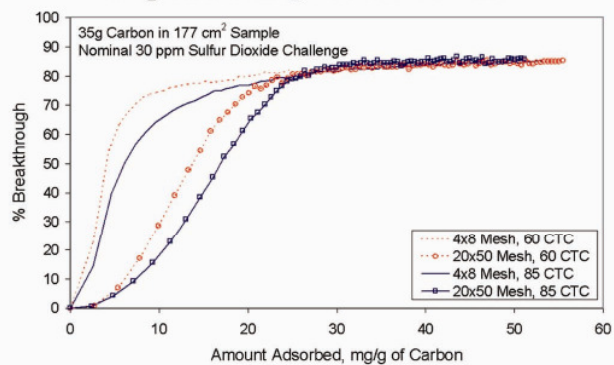
- Penetration to 5% Depth From Surface Uses 27% of Carbon Volume



32 Mesh

- Takes 300+ Particles To Get Equal Weight
- This Gives 6x Outside Surface Area

## SO<sub>2</sub> Breakthrough vs. Particle Size



## Impregnation Effect on SO<sub>2</sub> Breakthrough

