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# 5 STAR FILTER CARBON MEDIA FILTERS

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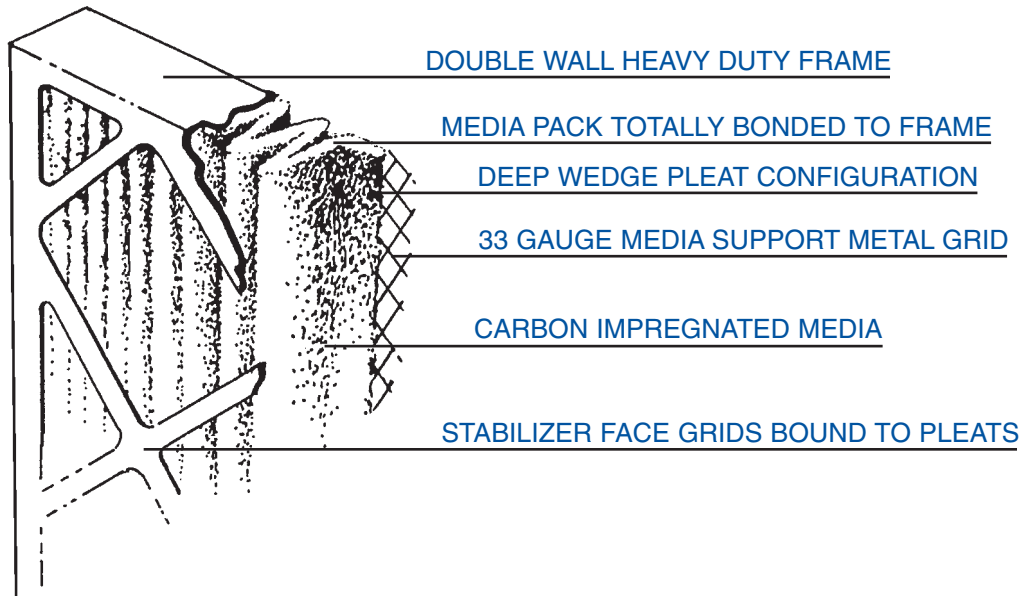
## PRODUCT DESCRIPTION

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## CONSTRUCTION

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- MEDIA:** The media used in 5 Star Filter carbon filters is an activated carbon impregnated, non-woven polyester. Carbon media filters are impregnated with 150% carbon add-on. Our carbon media contains approximately 10.44 grams of carbon per square foot of media area. Example: A 24 x 24 x 2 carbon media pleated panel filter would contain approximately 125 grams of carbon.
- PLEATS:** Carbon impregnated media is pleated, increasing the surface area of carbon exposed to the air flow. For example, a 24 x 24 x 2 carbon media filter contains 12 square feet of effective media face area (versus 4 square feet for a filter pad).
- FRAME:** The same heavy duty, rigid frames used in 5 Star Filter's popular medium efficiency pleated filter line are used in our carbon media filters.



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## FEATURES

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- High Rate of Adsorption** The rate of adsorption depends on the relationship between the pore structure, or surface area, and the shape of the contaminating molecules. The carbon is ground to an extremely fine particle size to increase the surface area available for adsorption.
- Pleated Configuration** The carbon impregnated media is pleated, increasing the surface area of carbon exposed to the air flow.
- Dual Filtration** Impregnating activated carbon on a dust filtration media is designed to achieve a dual filtration effect. The substrate filters the particulate matter, while the activated carbon filters the gas or vapor contaminant.
- Easy To Handle and Process** The activated carbon is thermally bonded to the substrate, resulting in very little "brush-off." The impregnation process coupled with the disposable pleated panel filter design virtually eliminates the mess associated with handling granular carbon.
- Product and Size Selection** Carbon media filters are made in all standard sizes of one, two, four, and six inch depths. Non-standard sizes, pleated inserts, pleated bulk rolls, flat pads and rolls are also available.
- UL Approved** Carbon media/150% carbon add-on filters are UL CLASS II approved.

# CARBON MEDIA PERFORMANCE DATA

## PERFORMANCE DATA

Nom. Size	Actual Size	Rated CFM	Initial Resistance Inches W.G.			
			Odor Ban	Turbo Jr.	Turbo OB	Sq. Ft.
10x20x1	9.5x19.5x.75	425	0.10	0.20	NA	2.5
10x25x1	9.5x24.5x.75	521	0.10	0.20	NA	3.3
12x20x1	11.5x19.5x.75	500	0.10	0.20	NA	3.1
12x24x1	11.75x23.75x.75	600	0.10	0.20	NA	3.7
12x25x1	11.5x24.5x.75	630	0.10	0.20	NA	3.9
14x20x1	13.5x19.5x.75	585	0.10	0.20	NA	3.6
14x25x1	13.5x24.5x.75	730	0.10	0.20	NA	4.5
15x20x1	14.5x19.5x.75	625	0.10	0.20	NA	3.9
15x25x1	14.5x24.5x.75	825	0.10	0.20	NA	5
16x20x1	15.5x19.5x.75	665	0.10	0.20	NA	4.1
16x24x1	15.5x23.5x.75	800	0.10	0.20	NA	5.1
16x25x1	15.5x24.5x.75	850	0.10	0.20	NA	5.2
18x24x1	17.5x23.5x.75	900	0.10	0.20	NA	5.6
18x25x1	17.5x24.5x.75	950	0.10	0.20	NA	5.8
20x20x1	19.5x19.5x.75	850	0.10	0.20	NA	5.2
20x24x1	19.5x23.5x.75	1000	0.10	0.20	NA	6.2
20x25x1	19.5x24.5x.75	1050	0.10	0.20	NA	6.5
20x30x1	19.5x29.5x.75	1250	0.10	0.20	NA	7.9
24x24x1	23.75x23.75x.75	1200	0.10	0.20	NA	7.5
24x30x1	23.5x29.5x.75	1500	0.10	0.20	NA	8.8
25x25x1	24.5x24.5x.75	1300	0.10	0.20	NA	8.1
10x20x2	9.5x19.5x1.75	700	0.14	0.30	0.37	4
12x20x2	11.5x19.5x1.75	850	0.14	0.30	0.37	5
12x24x2	11.5x23.5x1.75	1000	0.14	0.30	0.37	6
12x25x2	11.5x24.5x1.75	1050	0.14	0.30	0.37	6.3
14x20x2	13.5x19.5x1.75	975	0.14	0.30	0.37	6
14x25x2	13.5x24.5x1.75	1215	0.14	0.30	0.37	7.5
15x20x2	14.5x19.5x1.75	1040	0.14	0.30	0.37	6.5
15x25x2	14.5x24.5x1.75	1350	0.14	0.30	0.37	8.1
16x16x2	15.5x15.5x1.75	925	0.14	0.30	0.37	5.2
16x20x2	15.5x19.5x1.75	1100	0.14	0.30	0.37	6.5
16x24x2	15.5x23.5x1.75	1333	0.14	0.30	0.37	8.6
16x25x2	15.5x24.5x1.75	1400	0.14	0.30	0.37	8.1
18x24x2	17.5x23.5x1.75	1500	0.14	0.30	0.37	9
18x25x2	17.5x24.5x1.75	1550	0.14	0.30	0.37	9.4
20x20x2	19.5x19.5x1.75	1400	0.14	0.30	0.37	8.5
20x24x2	19.5x23.5x1.75	1665	0.14	0.30	0.37	10.2
20x25x2	19.5x24.5x1.75	1750	0.14	0.30	0.37	10.6
20x30x2	19.5x29.5x1.75	2083	0.14	0.30	0.37	13.5
24x24x2	23.375x23.375x1.75	2000	0.14	0.30	0.37	12
24x30x2	23.5x29.5x1.75	2500	0.14	0.30	0.37	14.6
25x25x2	24.5x24.5x1.75	2160	0.14	0.30	0.37	13.1
25x28x2	24.5x27.875x1.75	2400	0.14	0.30	0.37	9.5
12x24x4	11.375x23.375x3.5	1000	0.12	0.37	0.28	10.5
16x20x4	15.5x19.5x3.5	1100	0.12	0.37	0.28	13.6
16x25x4	15.5x24.5x3.5	1400	0.12	0.37	0.28	14.2
18x24x4	17.5x23.5x3.5	1500	0.12	0.37	0.28	12.8
20x20x4	19.5x19.5x3.5	1400	0.12	0.37	0.28	15.4
20x24x4	19.5x23.5x3.5	1650	0.12	0.37	0.28	16
20x25x4	19.5x24.5x3.5	1750	0.12	0.37	0.28	18.9
24x24x4	23.375x23.375x3.5	2000	0.12	0.37	0.28	24.3
25x29x4	24.5x28.5x3.5	2500	0.12	0.37	0.28	28.1

- (1) Special size filters are available
- (2) Width and height dimensions are interchangeable. Carbon media filters may be installed with pleats either vertical or horizontal.
- (3) Capacity ratings are recommended levels.
- (4) Resistance to air flow based on ASHRAE 52-76 standard test method.
- (5) Recommended final resistance. System design may dictate a lower change out point.

As part of our continuing program to improve the design and quality of all our products, we reserve the right to make changes without notice or obligation.

### Principle:

Carbon media will remove high amounts of gaseous contaminants during the first pass of air through the filter. During periods of high contaminant levels the carbon media will reduce peak loads to safe levels in a short time. The contaminant will "bleed-off" slowly at low safe levels which subsequently frees up the activated carbon. Now the filter is ready to adsorb again when there are peak levels. Obviously, all the contaminant initially removed doesn't "bleed-off," the contaminants remaining adsorbed in the carbon partially reduces its life. Life expectancy is relevant to concentration levels of gaseous contaminants present. [see (1) below.]

### Theory:

The explanation for this phenomenon is purely theoretical at this stage. However, what is believed to occur is that when the carbon is ground down to extremely fine particles for use in the impregnation process, the overall external exposed carbon surface area is greatly increased. The carbon media pleated configuration also extends the surface area exposed to the air flow. The internal surface area associated with the pores remains essentially unchanged. Based on the adsorption theory, the contaminant is first attracted to the outer exposed surface area and then migrates down into the pores. Due to carbon medias' increased exposed external surface it will attract and hold a larger amount of contaminant. Over time, a portion of the contaminant will migrate into the pores. The remainder of the contaminant, which is not attached close to a pore, will slowly "bleed-off" from the filter. This explains why, during subsequent testing of the same filter, it would again remove high levels of contaminant since the outer exposed area is free to attract the contaminants. Once the pores become full, total saturation is reached, carbon efficiency minimized, then carbon media filters should be replaced.

- (1) Recommendation for change out period is when the gaseous contaminant or odor is again present in the atmosphere at unsafe levels.

#### Applications:

- Air Conditioning Filters
- Air Intakes
- Paint Fume Filtration
- Heating Vents
- Furnace Filters
- Air Purification Devices
- Radon Adsorption
- Ozone Removal

#### Suggested Markets:

- Hospitals
- Nursing Homes
- Animal shelters
- Chemical laboratories
- Chemical plant offices
- Chemical storage
- Laboratories
- Night clubs
- Pollution control
- Paint departments
- Airports
- Households
- Commercial offices
- Resin manufacturing offices
- Rubber plant offices
- Sewage disposal plant offices
- Tar processing offices
- Varnish manufacturing offices
- Waste treatment plant offices
- Pulp and paper plant offices

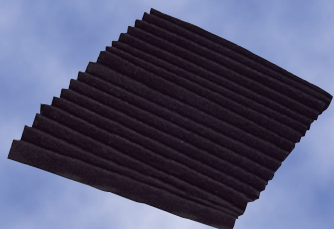
# ACTIVATED CARBON ADSORBENCY OF SELECTED MATERIAL & ODORS

Acetaldehyde	2	Cigarette smoke odor	4	Fish odors	4	Methyl cellosolve acetate	4	Propane	2
Acetic Acid	4	Citrus and other fruits	4	Floral scents	4	Methylchloride	3	* Propionaldehyde	3
Acetic Anhydride	4	Cleaning compounds	4	Fluorotrichloromethane	3	Methyl chloroform	4	Propionic acid	4
Acetone	3	Coal smoke odor	3	Food aromas	4	Methyl ether	3	Propyl acetate	4
* Acetylene	1	Coabustion odors	3	* Formaldehyde	2	Methyl ethyl ketone	4	Propyl alcohol	4
* Acrolein	3	Cooking odors	4	* Foraic acid	3	Methyl Forcate	3	Propyl chloride	4
Acrylic Acid	4	* Corrosive gases	3	Fuel gases	2	Methyl Ether	4	Propyl ether	4
Acrylonitrile	4	Cresole	4	Fumes	3	Methyl aercaptan	4	Propyl mercaptan	4
Adhesives	4	Cresol	4	Gangrene	4	Methylcyclohexane	4	* Propylene	2
Air-Wick	4	Crotonaldehyde	4	Garlic	4	Methylcyclohexanol	4	* Propyne	2
Alcoholic Beverages	4	Cyclohexane	4	Gasoline	4	Methylcyclohexanone	4	* Putrefying substances	3
* Alines	2	Cyclohexanol	4	Heptane	4	Methylcuclohexanone	4	Putrescine	4
* Ammonia	2	Cyclohexanone	4	Heptylene	4	Methelene chloride	4	Pyridine	4
Amyl acetate	4	Cyclohexene	4	Hexane	3	Mixed odors	4	Radiation products	2
Amyl alcohol	4	Dead animals	4	* Hexylene	3	Mold	3	Radon	3
Amyl ether	4	Decane	4	* Hexyne	3	Monochlorobenzene	4	Rancid oils	4
Animal odors	3	Decaying Substances	4	Hospital odors	4	Monofluorotrichloromethane	4	Resins	4
Anesthetics	3	Deodorants	4	Household smells	4	Moth balls	4	Reodorants	4
Aniline	4	Detergents	4	Hydrogen	1	* Naphtha (coal tar)	4	Ripening fruits	4
Antiseptics	4	Dibromoethane	4	* Hydrogen bromide	2	Naphtha (petroleum)	4	Rubber	4
Asphalt fumes	4	Dichlorobenzene	4	* Hydrogen chloride	3	Naphthalene	4	Sauerkraut	4
Automobile exhaust	3	Dichlorodifluoromethane	4	* Hydrogen cynide	2	* Nicotine	4	Sewer odors	4
Bathroom smells	4	Dichloroethane	4	* Hydrogen fluoride	2	* Nitric acid	3	Skatole	4
Benzene	4	Dichloroethylene	4	* Hydrogen iodide	3	Nitro benzenes	4	Slaughtering odors	3
* Bleaching solutions	3	Dichloroethyl ether	4	* Hydrogen selenide	2	* Nitroethane	4	Smog	4
Body odors	3	Dichloromonofluoromethane	3	* Hydrogen sulfide	3	* Nitrogen dioxide	2	Soaps	4
Borane	4	Dichloronitroethane	4	Incense	4	Nitroglycerine	4	Smoke	4
Bromine	4	Dichloropropane	4	Indole	4	Nitromethane	4	Solvents	3
Burned flesh	4	Dichlorotetrafluoroethane	4	Inorganic chemicals	3	Nitropropane	4	Sour milks	4
Burned food	4	Diesel fumes	4	Incomplete combustion	3	Nitrotoluene	4	Spilled beverages	4
Burning fat	4	* Diethylamine	3	Industrial wastes	3	Nonane	4	Spilled food stuffs	4
Butadiene	3	Diethyl ketone	4	Iodine	4	Noxious gases	3	Stale odors	4
Butane	2	Dimethylaniline	4	Idoform	4	Octalene	4	Stoddard solvent	4
Butanone	4	Dimethylsulfate	4	Irritants	4	Octane	4	Stiffness	4
Butyl acetate	4	Xoxane	4	* Isophorone	4	Odorants	4	* Styrene monomer	4
Butyl alcohol	4	Dipropyl ketone	4	* Isoprene	3	Onions	4	* Sulfur dioxide	2
Butyl cellosolve	4	Disinfectants	4	Isopropyl acetate	4	Organic chemicals	4	* Sulfur trioxide	3
Butyl chloride	4	Embalming odors	4	Isopropyl alcohol	4	Ozone	4	Sulfuric acid	4
Butyl ether	4	Ethane	1	Isopropyl ether	4	Packing house odors	4	Tar	4
* Butylene	2	Ether	3	Kerosene	4	Paint and redecorating odors	4	* Tarnishing gases	3
* Butyne	2	Ethyl acetate	4	Kitchen odors	4	Palmitic acid	4	Tetrachloroethylene	4
* Butyraldehyde	3	Ethyl acrylate	4	Lactic acid	4	Paper deterioratons	4	Theatrical makeup odor	4
Butyric acid	4	Ethyl alcohol	4	Lingering odors	4	Paradichlorobenzene	4	Tobacco smoke odor	4
Camphor	4	* Ethyl amine	3	Liquid fuels	4	Paste and glue	4	Toilet odors	4
Cancer odor	4	Ethyl benzene	4	Liquor odors	4	Pentane	4	Toluene	4
Caprylic acid	4	Ethyl bromide	4	Lubricating Oils and greases	4	* Pentanone	4	Toluidine	4
Carbolic acid	4	Ethyl chloride	3	Lysol	4	* Pentylene	3	Trichloroethylene	4
Carbon disulfide	4	Ethyl ether	3	Masking agents	4	* Pentyne	3	Trichloroethane	4
* Carbon dioxide	1	Ethyl formate	3	Medicinal odors	4	Perchloroethylene	4	Turpentine	4
Carbon monoxide	1	Ethyl mercaptan	3	Melons	4	Perfumes, cosmetics	4	Urea	4
Carbon tetrachloride	4	* Ethyl silicate	4	Menthol	4	Perspirations	4	Uric acid	4
Cellosolve	4	* Ethylene	1	Mercaptans	4	Persistent odors	4	Valeric acid	4
Cellosolve acetate	4	Ethylene chlorohydrin	4	Mesitly oxide	4	Pet odors	4	Valericdehyde	4
Charred materials	4	Etju;eme docj;prode	4	Methane	1	Phenol	4	Vinegar	4
Cheese	4	Ethylene oxide	3	Methyl acetate	3	Phosgene	3	Vinyl chloride	4
* Chlorine	3	Essential oils	4	Methyl acrylate	4	Pitch	4	Volatile materials	3
Chlorobenzene	4	Eucalyptole	4	Methyl alcohol	3	Plastics	4	Waste products	4
Chlorobuadiene	4	Exhaust fumes	3	Methyl bromide	3	Poison gases	3	Wood alcohol	3
Chloroform	4	Female odors	4	Methyl butyl ketone	4	Pollen	3	Xylene	4
Chloronitropropane	4	Fertilizer	4	Methyl cellosolve	4	Popcorn and candy	4		
Chloropierin	4	Film processing odors	3			Poultry Odors	4		

Some of the contaminants listed in the table use specific chemical compounds, some represent classes of components, and others are mixtures and of variable composition. Activated charcoal's capacity for odors varies somewhat with the concentration of air, with humidity, and temperature, and with the actual velocity used through the filters. The numbers given represent typical or average conditions and might vary in specific instances. The values in the table have been assembled from many sources including laboratory tests and field experience. In cases where numerical values were not available, the author has listed his opinion of the probable capacity based of general experience. This table should be used as a general rule only. The capacity index has the following meaning:

1. Absorption capacity is low for these materials. Activated charcoal cannot be satisfactorily used to remove them under ordinary circumstances.
2. Includes substances which are not highly absorbed but which might be taken up sufficiently to give good service under the particular conditions of operation. These require individual checking.
3. Satisfactory capacity for all items in this category. These constitute good applications but the capacity is not as high as for category 4. Absorbs about 10% to 25% of its weight—average about 1/6 (16.7%).
4. High capacity for all materials in this category. One pound takes up about 20% to 50% of its own weight—average about 1/3 (33 1/3%). This category includes most of the odor causing substances.

\* Straight activated charcoal does not have much capacity for some reactive gases, such as ammonia, formaldehyde, etc. In some cases where the gas is chemically reactive, appropriate impregnated activated charcoal can be recommended. Those odorants marked above with an asterisk fall into this category.



Pads, rolls, and pleated inserts are available.

