

# VOC FILTERS with ACTIVATED CARBON

## WHAT IS ACTIVATED CARBON?

Activated carbon is a form of charcoal which has the ability to remove impurities from air, gas and liquids. When various impurities come into contact with the activated carbon, the constituent molecules become trapped in tiny capillary passages on the surface of the carbon in a process called adsorption. Due to differences in molecular structures, some impurities are more readily adsorbed than others. See “Activated Carbon Absorbency Ratings”.

## DUAL FILTRATION EFFECT

Amaircare activated carbon impregnated non-woven polyester filters provide a dual filtration effect. The polyester media filters particulate matter while the activated carbon filters gaseous contaminants.

## V.O.C. CANISTERS

All Amaircare HEPA systems have the option of a third stage V.O.C. Canister for added V.O.C. filtration. These canisters have a much larger surface area to capture V.O.C.'s, which results in both higher V.O.C. capture rate and longer filter life. V.O.C. Canisters can last for 1 full year before needing replacement depending on the amount of pollution in the ambient environment.

## HOW DO THEY WORK?

V.O.C. canisters capture contaminants the same way as carbon impregnated polyester filters. Instead of using impregnated polyester media, V.O.C. canisters use solid carbon which have a comparably larger surface area of 1000 m<sup>2</sup>/g. This makes V.O.C. canisters the filter of choice for situations where V.O.C. removal is a prime objective.

Surface area for adsorption of the 8” ET VOC Canister is approximately 76,500 m<sup>2</sup>

Surface area for adsorption of the 16” ET VOC Canister is approximately 164,000 m<sup>2</sup>

Each canister is sealed in order to prevent it from adsorbing ambient impurities prior to installation in the air filtration system.

Custom blends of specially treated activated carbon are highly effective against a wide range of gases and odors.

## FORMALDEHYDE

Formaldehyde is a colourless gas that is emitted mainly from household products and building materials. Low levels of formaldehyde in indoor air are very common. When found at high levels in air, it can be detected by a sharp smell. High concentrations of formaldehyde can cause irritation of the eyes, nose and throat and can worsen asthma symptoms in children and infants.

### Sources of formaldehyde include:

- pressed wood products that use glues that contain formaldehyde, such as particle board, hardwood, plywood paneling, and medium density fibreboard. These products may be used in home construction and renovations, and are also often used to make furniture and cabinets;
- paints, adhesives, varnishes and floor finishes;
- household products such as wallpaper, cardboard and paper products;
- vehicle exhaust from attached garages or from outdoors;
- smoke from fireplaces and wood-burning stoves; and
- tobacco smoke.

## IMPACT ON HEALTH

Formaldehyde is an irritant, and exposure to high concentrations of formaldehyde can cause burning sensations in the eyes, nose and throat.

Long-term exposure to moderate formaldehyde concentrations (at levels lower than those causing irritation) may also be linked to respiratory symptoms and allergic sensitivity, especially in children.

At very high concentrations, formaldehyde can cause cancer of the nasal cavity. It has been linked to this rare type of cancer in industry workers who are regularly exposed to high levels of formaldehyde.

## FORMALDEZORB VOC CANISTER

Amaircare’s standard VOC Canisters capture approximately 20% aldehydes (including formaldehyde) in a single pass. Amaircare’s Formaldezorb VOC Canister is a proprietary specialty activated carbon that is chemically modified on the surface with a compound specifically targeting formaldehyde and other aldehydes. Formaldehyde being the most reactive aldehyde, binds to the surface of the modified carbon in a highly effective manner. Based on this specially formulated process, Amaircare Formaldezorb VOC Canisters remove 60% to 75% of formaldehyde in a single pass. The high performance removal of the Formaldezorb VOC Canister is specified by healthcare professionals in the USA and Canada where exposure to formaldehyde is a current and growing health concern since recognition by the United States Environmental Protection Agency (EPA) as a known carcinogen.

# Activated Carbon Adsorbency Ratings

The capacity index has the following meaning:

**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.

**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 2/3%)

**2:** Includes substances which are not highly adsorbed but which might be taken up sufficiently to give good service

under the particular conditions of operation. These require individual checking.

**1:** Adsorption capacity is low for these materials. Activated charcoal cannot be satisfactorily used to remove them under ordinary circumstances.

Some of the contaminants listed in the table are specific chemical co-pounds, some represent classes of co-pounds, and others are mixtures and of variable composition. Activated charcoal's capacity for odors varies somewhat with the concentration in 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. This table should be used as a general rule only.

\*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.

Acetaldehyde	2	Coal smoke odor	3	*Formaldehyde	2	Methyl ether	3	Propane	2
Acetic Acid	4	Combustion odors	4	*Formic acid	3	Methyl ethyl ketone	4	*Propionaldehyde	3
Acetic Anhydride	4	Cooking odors	4	Fuel gases	2	Methyl formate	3	Propionic acid	4
Acetone	3	Corrosive gases	3	Fumes	3	Methyl isobutyl ketone	4	Propyl acetate	4
Acrylic Acid	4	Creosote	4	Gangrene	4	Methyl aercaptan	4	Propyl alcohol	4
Acrylonitrile	4	Cresol	4	Garlic	4	Methrlcyclohexane	4	Propyl chloride	4
Adhesives	4	Crotonaldehyde	4	Gasoline	4	Methylcyclohexanol	4	Propyl ether	4
Air-Wick	4	Cyclohexane	4	Heptane	4	Methylcyclohexanone	4	Propyl oercaptan	4
Alcoholic Beverages	4	Cyclohexanol	4	Heptylene	4	Methylene chloride	4	*Propylene	2
*Amines	2	Cyclohexanone	4	Hexane	3	Mildew	3	*Propyne	2
*Ammonia	2	Cyclohexene	4	*Hexylene	3	Mixed odors	4	Putrefying substances	3
Amyl acetate	4	Dead animals	4	Hexyne	3	Mold	3	Putrescine	4
Amyl alcohol	4	Decane	4	Hospital odors	4	Monochlorobenzene	4	Pyridine	4
Amyl ether	4	Decaring Substances	4	Household smells	4	Moth balls	4	Radiation products	2
Animal odors	3	DeodorantsDetergents	4	Hydrogen	1	Naphtha (coal tar)	4	Radon	3
Anesthetics	3	Dibroeoethane	4	*Hydrogen bromide	3	Naphtha (petroleum)	4	Rancid oils	4
Aniline	4	Dichlorobenzene	4	*Hydrogen chloride	2	Naphthalene	4	Resins	4
Antiseptics	4	Dichlorodifluoronethane	4	*Hydrogen cyanide	3	Nicotine	4	Reodorants	4
Asphalt fumes	4	Dichloroethane	4	*Hydrogen fluoride	2	*Nitric acid	3	Ripening fruits	4
Automobile exhaust	3	Dichloroethylene	4	*Hydrogen iodide	3	Nitro benzenes	4	Rubber	4
Bathroom smells	4	Dichloroethyl ether	4	*Hydrogen selenide	2	Nitroethane	4	Sauerkraut	4
Benzene	4	Dichloronitro*	4	*Hydrogen sulfide	3	*Nitrogen dioxide	2	Sewer odors	4
*Bleaching solutions	3	ethane	4	Incense	4	Nitroglycerine	4	Skatole	4
Body odors	4	Dichloropropane	4	Indole	4	Nitroethane	4	Slaughtering odors	3
Borane	3	Diesel fumes	4	Inorganic chemicals	3	Nitropropane	4	Smog	4
Bromine	4	*Diethylamine	3	Incomplete combustion	3	Nitrotoluene	4	Soaps	4
Burned flesh	4	Diethyl ketone	4	Industrial wastes	3	Nonane	4	Smoke	4
Burned food	4	Di-ethylaniline	4	Iodine	4	Noxious gases	3	Solvents	3
Burning fat	4	Dinethylsulfate	4	Iodoform	4	Octalene	4	Sour milks	4
Butane	2	Dioxane	4	Irritants	4	Octane	4	Spilled beverages	4
Butanone	4	Dipropyl ketone	4	Isophorone	4	Odorants	4	Spoiled food stuffs	4
Butyl acetate	4	Disinfectants	4	*Isoprene	3	Onions	4	Stale odors	4
Butyl alcohol	4	Embalming odors	4	Isopropyl acetate	4	Organic chemicals	4	Stoddard solvent	4
Butyl cellosolve	4	Ethane	1	Isopropyl alcohol	4	Ozone	4	Stiffness	4
Butyl chloride	4	Ether	3	Isopropyl ether	4	Packing house odors	4	Styrene monomer	4
Butyl ether	4	Ethyl acetate	4	Kerosene	4	Paint and redecorating	4	*Sulfur dioxide	2
*Butylene	2	Ethyl acrylate	4	Kitchen odors	4	Oodors	4	*Sulfur trioxide	3
*Butyne	2	Ethyl alcohol	4	Lactic acid	4	Palmitic acid	4	Sulfuric acid	4
Cancer odor	4	*Ethyl anine	3	Lingering odors	4	Paper deterioration	4	Tar	4
Caprylic acid	4	Ethyl benzene	4	Liquid fuels	4	Paradichlorobenzene	4	*Tarnishing gases	3
Carbolic acid	4	Ethyl bromide	4	Liquor odors	4	Paste and glue	3	Tobacco smoke odor	4
Carbon disulfide	4	Ethyl chloride	3	Lubricating oils	4	Pentane	4	Toilet odors	4
*Carbon dioxide	1	Ethyl ether	3	Lysol	4	Pentanone	3	Toluene	4
Carbon monoxide	1	Ethyl formate	3	Masking agents	4	*Pentylene	3	Trichloroethylene	4
Carbon tetrachloride	4	Ethyl mercaptan	3	Medicinal odors	4	*Pentyne	3	Trichloroethane	4
Cellosolve	4	Ethyl silicate	4	Melons	4	Perchloroethylene	4	Turpentine	4
Cellosolve acetate	4	*Ethylene	1	Menthol	4	Perfumes, cosmetics	4	Urea	4
Charred materials	4	Ethylene chlorohydrin	4	Mercaptans	4	Perspiration	4	Uric acid	4
Cheese	4	Ethylene dichloride	4	Mesityl oxide	4	Persistent odors	4	Valeric acid	4
*Chlorine	3	Ethylene oxide	3	Methane	1	Pet odors	4	Valeraldehyde	4
Chlorobenzene	4	Essential oils	4	Methyl acetate	3	Phenol	3	Vinegar	4
Chlorobutadiene	4	Eucalyptole	4	Methyl acrylate	4	Phosgene	3	Vinyl chloride	3
Chloroform	4	Exhaust fumes	3	Methyl alcohol	3	Pitch	4	Volatile materials	3
Chloronitropropane	4	Female odors	4	Methyl bromide	3	Plastics	4	Waste products	4
Chloropierin	4	Fertilizer	4	Methyl butyl ketone	4	Poison gases	3	Wood alcohol	3
Cigarette saoke odor	4	Film processing odors	3	Methyl cellosolve	4	Pollen	3	Xylene	4
Citrus and other fruits	4	Fish odors	4	Methyl chloride	3	Popcorn and candy	4		
Cleaning compounds	4	Fluorotrichloromethane	4	Methyl chloroform	4	Poultry odors	4		