Summary Carbon and Chemical Filters

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Camsure
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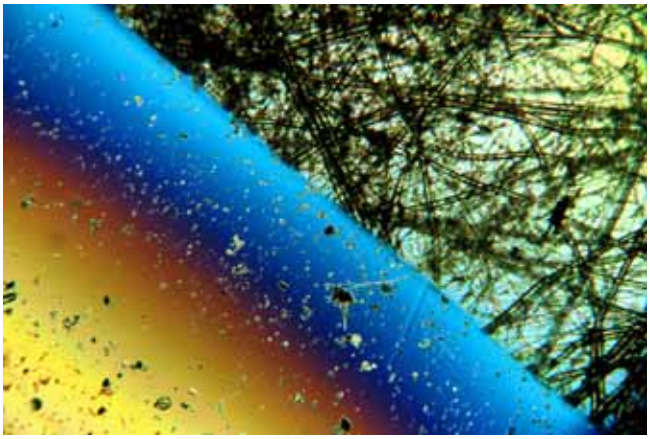
Indoor air quality, EN 13779

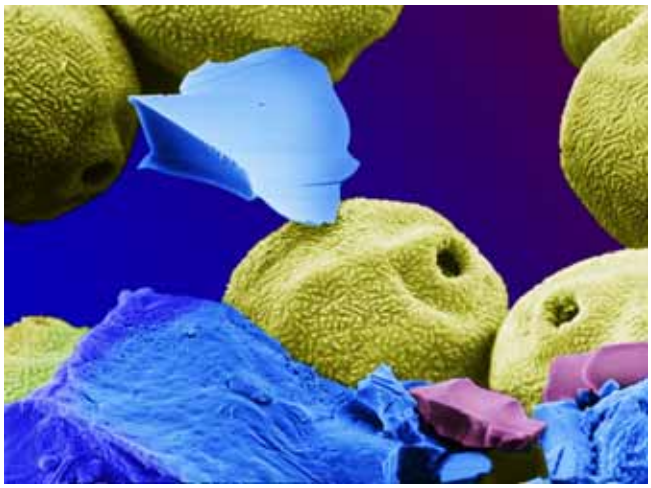
The industrialised world

The industrialised world has changed immeasurably over the past 50 years. One very real difference is that the air that we breathe is more heavily, and more diversely, polluted. Although there are natural sources of pollution, the main concern is pollution caused by human activity. Tens of thousands of synthetic chemicals (which do not exist in any natural state) are now manufactured at an estimated rate of more than a billion tons per year. These chemicals are released into the atmosphere when they are produced, and when they are used they can travel great distances. They inevitably form part of our lives. Our lifestyles (work and leisure) mean that we spend more and more time inside buildings. The fact that buildings have to be ventilated means that we are increasingly exposed to particulate and gas pollution from the outdoor air.



The impact of pollution on our health

Air pollution can be categorised as either particulate (dust) or gas (molecular). Particles enter the body and the respiratory system via breathing. Gas or molecular pollution also penetrates the body via the air we breathe, but from the lungs it enters the bloodstream and in turn infiltrates the whole body. Though these chemicals may be invisible, pollution does not pass us by. It takes numerous different forms, for example vehicle exhaust gas, factory chimneys, the dust raised by car traffic and cigarette smoke. It has been known for some time that exposure to pollution has an impact on human beings. The common symptoms are headaches, watering eyes and lower performance at work. Such symptoms are traditionally referred to as Sick Building Syndrome or similar terms.



The new European Standard for Ventilation

European Standard EN 13779 is aimed at achieving a comfortable, healthy indoor environment in all seasons with acceptable installation and running costs. EN 13779 has now been adopted as a national standard in all countries. It specifies the required filter performance in a system to achieve good IAQ taking into consideration contamination in the outdoor air. Outdoor air is split into five categories, from ODA 1, in which the air is pure apart from temporary pollution such as pollen, up to ODA 5 with high concentrations of gas and particles. This elevated pollution level ODA 5 is now typical of the contamination in urban areas.

Recommendations in EN 13779 for air filters

Outdoor air quality	IAQ Indoor Air Quality			
	IDA 1 (High)	IDA 2 (Medium)	IDA 3 (Moderate)	IDA 4 (Low)
ODA 1	F9	F8	F7	F6
ODA 2	F7 / F9	F6 / F8	F6 / F7	G4 / F6
ODA 3	F7 / F9	F8	F7	F6
ODA 4	F7 / F9	F6 / F8	F6 / F7	G4 / F6
ODA 5	F6 / GF / F9	F6 / GF / F9	F6 / F7	G4 / F6

Table refering to appendix "A3. Use of Air Filters" in The European Standard EN 13779.

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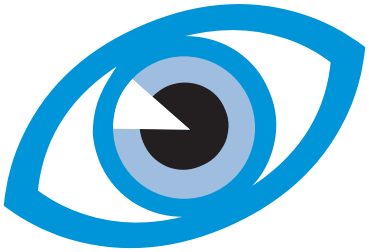
Adsorption index of activated carbon



Key:

4. A very high level of adsorption, in the order of 20 - 40% by weight of dry carbon.
3. Good index with a capacity of 10 - 20%.
2. Mediocre index that may require a particularly long contact time, requires case by case study.
1. Practically no adsorption, another solution must be sought.

Adsorption index of Activated Carbon for various types of odour

2 Acetaldehyde	1 Carbon monoxide	3 Ethyl bromide	4 Lubricants	3 Pentylene
4 Acetic acid	4 Carbon tetrachloride	1 Ethylene	4 Medicinal odours	3 Pentyne
4 Acetic anhydride	3 Chlorine	4 Ethylene dichloride	4 Menthol	4 Perchloroethylene
3 Acetone	4 Chlorobenzene	3 Ethylene oxide	4 Mercaptan	4 Perfumes, cosmetics
1 Acetylene	4 Chloroform	2 Ethyl mercaptan	1 Methane	4 Perspiration
3 Acids	4 Chloronitropropane	4 Ethyl silicate	3 Methyl acetate	4 Petrol
3 Acrolein	4 Chloropicrin	4 Eucalyptol	4 Methyl acrylate	4 Phenol
4 Acrylic acid	4 Chloroprene	4 Faecal odours	3 Methyl alcohol	3 Phosgene
4 Acrylonitrile	3 Cigarette smells	3 Farmyard smells	3 Methyl bromide	4 Plastics
4 Adhesives	4 Cleaning solvents	4 Fertiliser	4 Methyl butyl ketone	2 Propane
4 Alcohol	3 Cooking smells	3 Film developing	3 Methyl chloride	4 Propanol
4 Amines	4 Creosote	2 Fish odours	4 Methylcyclohexane	2 Propylene
2 Ammonia	4 Cresol	4 Floral odours	4 Methylcyclohexanol	4 Propyl mercaptan
2 Amyl acetate	4 Cyclohexane	2 Formaldehyde	4 Méthylcyclohexanone	4 Resins
4 Amyl alcohol	4 Cyclohexanol	3 Formic acid	4 Methylene chloride	4 Rubber
4 Amyl ether	4 Cyclohexanone	3 Freon	3 Methyl ether	2 Slaughterhouse
3 Anaesthetics	4 Cyclohexene	4 Gangrene smell	4 Methyl ethyl ketone	3 Soap
4 Aniline	4 Deodorants	4 Garlic	4 Methyl isobutyl ketone	3 Solvents
4 Animal carcases	4 Detergents	4 Heptane	4 Methyl mercaptan	4 Styrene monomer
3 Animal odours	4 Dibromoethane	4 Heptylene	4 Monochlorobenzene	2 Sulphur components
4 Antiseptics	4 Dichlorobenzene	3 Hexane	4 Naphtha (coal tar)	2 Sulphur dioxide
4 Asphalt fumes	4 Dichloroethane	3 Hexylene	4 Naphtha (oil)	4 Sulphuric acid
3 Bathroom smells	4 Dichloroethylene	3 Hospital odours	4 Naphthalene	3 Sulphur trioxide
4 Benzene	4 Diesel fumes	4 Household smells	4 Nicotine	4 Tar
3 Bleaching solutions	3 Diethylamine	1 Hydrogen	3 Nitric acid	4 Tetrachloroethane
2 Body odours	3 Diethyl ketone	2 Hydrogen bromide	4 Nitrobenzene	4 Tetrachloroethylene
4 Bromine	4 Dimethylaniline	2 Hydrogen chloride	4 Nitroethane	3 Tetrahydrofuran
4 Burnt flesh	4 Dimethylsulfate	2 Hydrogen cyanide	2 Nitrogen dioxide	4 Tobacco odours
3 Butadiene	4 Dioxane	2 Hydrogen fluoride	4 Nitroglycerine	4 Toilet smells
2 Butane	4 Dipropyl ketone	3 Hydrogen iodide	4 Nitromethane	4 Toluene
4 Butanone	4 Disinfectants	2 Hydrogen sulphide	4 Nitropropane	4 Trichlorethylene
4 Butyl acetate	4 Embalming products	4 Incense	4 Nitrotoluene	4 Urea
4 Butyl alcohol	4 Essential oils	3 Industrial waste	4 Nonane	4 Uric acid
4 Butyl chloride	1 Ethane	4 Iodine	4 Octane	4 Vehicle exhaust
2 Butylene	3 Ether	4 Iodoform	4 Onions	4 Vinegar
4 Butyric acid	4 Ethyl acetate	3 Isoprene	4 Ozone	3 Vinyl chloride
4 Camphor	4 Ethyl acrylate	4 Isopropyl acetate	4 Paint odours	3 Wood alcohol
4 Caprylic acid	4 Ethyl alcohol	4 Isopropyl alcohol	4 Paradichlorobenzene	4 Xylene
3 Carbon disulphide	3 Ethylamine	4 Kerosene	3 Pentane	
1 Carbon dioxide	4 Ethylbenzene	4 Lactic acid	4 Pentanone	

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