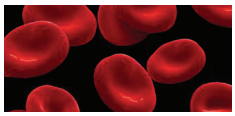
CARLSON FILTRATION






Carlcarb Filtration

Carbon treatment and filtration for the food, beverage, pharmaceutical, biotech and chemical industries.

purity through quality™ since 1923

Carlson filter housing and filters

Introduction

Activated carbon can be produced from a variety of raw materials, the main sources being: Coconut shell, Bituminous and Lignite coal, wood and peat.

Carbon filtration

The purpose of the "activation" process is twofold: to create the unique internal pore structure with massive surface area and to increase the adsorptive properties by removing hydrocarbon adhering to the carbon. Steam activation using oxidising gases (water vapour and carbon dioxide) takes place in a rotary kiln at temperatures of between 800 and 1000°C for upto 100 hours and produces predominately higher purity powders with a high level of micro porosity. Chemical activation, using chemicals such as Zinc Chloride or Phosphoric Acid, produces powders with a higher proportion of meso and macropores ideal for the adsorption of larger molecules.

Because of its outstanding adsorptive properties activated carbon plays a critical role in a diverse range of applications. Probably best known as a de-colourising and/or de-odourising agent, activated carbon also has significant usage within the pharmaceutical, biotech and chemical industries.

Pore sizes of carbons are generally classified as:

Macropores – above 50 nm diameter
Mesopores – 2-50 nm diameter
Micropores - <2 nm diameter

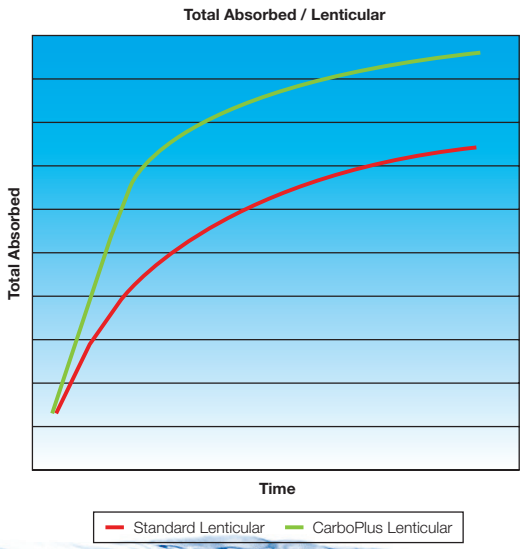
All carbons have a range of the three pore sizes but will exhibit significantly different proportions of each due to their different origin materials and activation process. Carlson's range of **CarlCarb** filter media incorporating a wide range of powdered activated carbons - available in both sheet and lenticular form – provides customers with the scope to choose the correct carbon for their specific application.

The benefits of incorporating Powered Activated Carbon into filter media include:

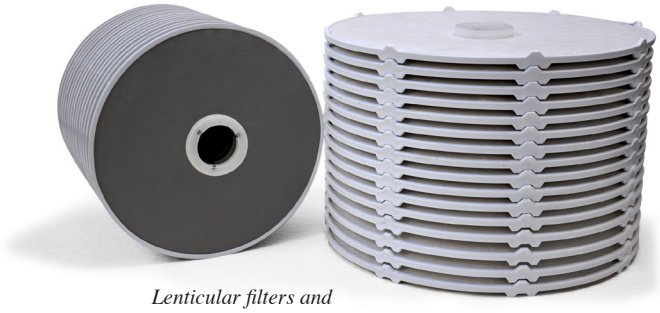
- More effective use of carbon (fewer kg of carbon required)
- Elimination of need for loose activated carbon powder or granules
- Elimination of secondary filtration to remove activated carbon from process fluid
- No messy filter cake handling or disposal
- Minimises potential for addition error
- Easier and cheaper disposal of spent filter materials

In addition to these it would also be valid to claim that, subject to the quantity of carbon required (which is obviously dictated by the volume/hour of product to be processed), process through filter media incorporating carbon can be upto 150% more efficient than bulk addition of powdered activated carbon in a mixing vessel.

In order to increase the weight of carbon available in lenticular form, Carlson has developed the* CarboPlus *16" diameter module holding 25% by weight more carbon than the standard module thus enabling 25% increase in performance.



A large range of products amd chemicals are treated with Carlson filters



Lenticular filters and Carbon filters

Lenticular cartridges are of particular benefit within the pharmaceutical industry since they provide a totally enclosed, sterile environment thus eliminating product loss and/or external contamination.

Lenticular filtration

Carlson lenticular modules are equipped with backing papers to prevent carbon fibre migration.

Further information regarding Carlson lenticular modules is available in the CarLent brochure.

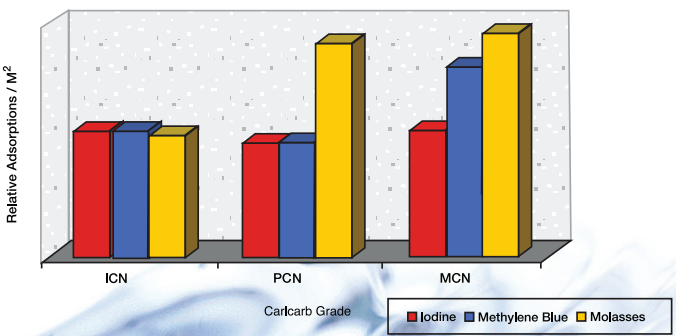
Pharmaceutical Grade Carbons

In the vast majority of API (Active Pharmaceutical Ingredient) processes activated carbon is required to remove colour, odour or endotoxins. Carlson offers the following standard grades for these processes although other bespoke carbons are available – subject to volume. The 3 grades listed are all low (<0.1 EU/ml) pyrogen content, high (60% w/w) carbon content and standard (1300 gsm) weight.

Carlcarb ICN has excellent micro and meso porosity and is widely used in pharmaceuticals for endotoxin reduction and de-colourisation.

Carlcarb MCN is a high performance, high purity carbon with a broad range of adsorption but has particularly high macroporosity associated with de-colourisation of vitamins, antibiotics and proteins.

Carlcarb PCN is a cost effective carbon used in general pharmaceutical applications. Provides a high level of activation across the macro, meso and micro pore sizes, excellent colour adsorption and low ion levels.



General Purpose Grades

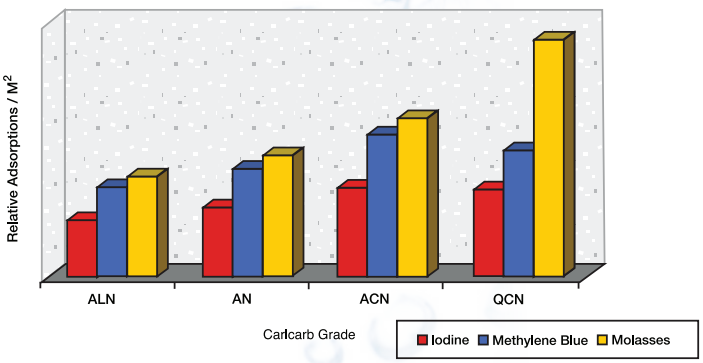
For beverage, chemical and general applications where de-colourisation and/or de-odourisation are required, Carlson offers the **CarlCarb** "A" range of media in 3 different forms to suit different applications.

CarlCarb AN with standard 46% (w/w) carbon content and standard media weight of 1300 gsm

CarlCarb ALN with standard 46% (w/w) carbon content but in lighter weight (1080 gsm) media. This grade finds particular favour in areas where minimal colour reduction is required.

CarlCarb ACN with higher 60% (w/w) carbon content in standard (1300 gsm) media.

CarlCarb QCN is a higher adsorption, higher performance grade for use in markets similar to the "A" range. With high 60% (w/w) carbon content, low ion content and a higher adsorption capacity, QCN is a premium performance version of the CarlCarb "A" range.



Grade	12" dia Kg PAC	Module M²	16" dia Kg PAC	Module M²	40 cm Kg PAC	Sheet M²	60 cm Kg PAC	Sheet M²
AN	1.08	1.8	2.16	3.6	0.1	0.16	0.23	0.36
ALN	0.9	1.8	1.8	3.6	0.08	0.16	0.18	0.36
All CN	1.4	1.8	2.8	3.6	0.12	0.16	0.27	0.36
CarboPlus			3.5	4.5				

Carbon impregnated media should be considered as a treatment sheet and flow rates should therefore be quite low ie between 100 – 300 l/m2/ hour subject to loading.

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Complementary Filtration

Cartridges, Bags and Housings.

Carlson can also offer a comprehensive range of cartridges from wound, thermal bonded and pleated through to PES membranes as well as bags in felts of Viscose, Rayon, Polypropylene, Polyester, Nylon or Nylon monofilament. They are available for either new application or to retrofit to current installations. A full range of housings are also available to compliment this range. For further information please see our **Carlcart** brochure.

Test equipment

Mini capsules, 6cm and 10cm housings a 2 sheet 20cm press and a mini lenticular housing for up to 4 cells are available.

Filtration Equipment and Spares

New filter equipment

Carlson offers a comprehensive range of new filtration equipment, incorporating a full range of filter presses and plate and frame filters. The range includes plate and frame and sheet filters from 20x20cm to 120x120cm. Manual models and fully automatic closing systems are available.

Reconditioned filter equipment

Carlson also offers reconditioned sheet and plate and frame filter presses. We have developed a wide ranging network of contacts in the filter press community as well as amongst dealers in used factory equipment. On arrival at Carlson's factory all filters are rebuilt to exacting standards to meet customers filtration requirements and to achieve an "as good as new" quality.

Filter spares

Another important element of Carlson's support service is to supply spare parts for their filter range. These are categorised into:

a. Consumable spares which include eyelet seals in a host of materials including Nitrile, Silicon, Natural Rubber, EPDM, Butyl and Viton.

b. Servicing spares including pump spares, sight glasses, valve diaphragms and pressure gauges etc. Service kits for hydraulic filter press closing systems are also available.

Dealer stamp

CARLSON FILTRATION

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