Carbon Filters (GAC)

Granular Activated Carbon (GAC) filters are an excellent choice for removal of chlorine, taste and odour, or organics in water. Some types will even reduce metals. There are many different variations but most are either coconut coal, wood based or bone.

What is granular activated carbon (GAC)?
Coconut husks, coal or bone are heat treated in the absence of oxygen to produce “activated” carbon. Granular just means the shapes produced are irregular particles in sizes ranging from 0.2 to 5mm (ideal sizes for water treatment). The treatment is designed to produce a vast structure of pores creating a massive surface area for adsorption.

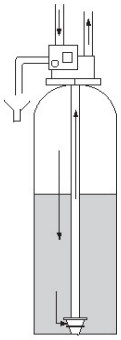
How does GAC work?
GAC works by absorbing the soluble pollutants onto its surface and holding them. Because it has such a massive surface area the amount of absorption is probably one of the greatest of any natural man made material available. Eventually all the pores are filled and the carbon will need to be replaced. As the contaminants are absorbed onto the carbon backwashing the filters is a good idea as the pollutants are held firm but the carbon can be rebeded stopping channelling.

What will GAC remove ?
Chlorine, taste
Odours, organics
Colour, ozone, metals

Which type of GAC do I need ?
By choosing the type of GAC coconut, coal wood etc and by treating it in suitably different ways its performance can be optimised for particular jobs. 12 x 30 coconut shell is often used in systems for dechlorination, organic colour removal and protection of RO membranes. Coal based GAC is often used for removing larger chain organic molecules or where high hardness and mechanical strength are need. If the carbon is treated with silver it acts as a natural bactericide and helps reduce bacteria although this is expensive. Acid washing carbon increases the purity, reduces the ash content and is particularly suited for ultrapure water treatment systems. Bone charcoal is phosphate rich and good at reducing natural colour, and heavy metals including lead.

Different contaminants require different contact times and different flow rates so careful attention to the flow rates and the application is important eg for chlorination using coconut based GAC at contact time of 4-6 minutes is suggested.

How does it work?
Water flows into the valve at the top, down through the media and then up through the ‘riser’ tube in the middle of the vessel. As the water travels through the media the sediment is trapped so only clean clear water flows out to service. There are timer options that can be set to automatically self clean (backwash) and wash away any of the accumulated sediment.



How to size.
On average 160 litres of water is used per person per day. This normally occurs in two peak periods, one in the morning and one in the evening. A family of four typically uses 700 litres of water per day but may use 300 litres in an hour in the morning. Larger households, farms, stables and irrigations systems all use more water.

When sizing a system the peak flow rate need to be taken into account. The size of the pump also needs to be taken into account as these filters normally use twice the service flow rate to lift the bed and backwash away the trapped sediment. If the backwash flow is not available two smaller units running side by side is often a good solution.

The vessel size is given as the diameter and the height (in inches).
Recommended operating pressure range 20 to 120 psi. Water temperature range from 2 to 38°C.

GAC sizing (based on dechlorination)

Vessel Ø" X h"	Flow m3/h	Back wash m3/hr	Vol. (m^3) treated at 1ppm Cl_2	Valve Option	Ves (B1)	Ves (H1)
8-35	**0.35**	0.7	2000	263/WS1	220	904
12-48	**0.9**	1.8	4000	263/WS1	315	1235
13-54	**1.0**	2	6000	263/WS1	334	1374
14-65	**1.2**	2.3	8000	263/WS1	369	1660
16-65	**1.6**	3.2	10,000	263/WS1	406	1660
18-65	**2.1**	3.9	14,000	263/WS1	469	1750
21-60	**2.7**	5.5	18,000	293/WS1½	552	1640
24-69	**3.6**	6.8	24,000	293/WS½	610	1890
30-72	**6**	11	40,000	293/WS2	770	2050
36-72	**8.4**	16	56,000	298/WS2	927	2150
42-78	**11**	22	67,000	WS2H	1133	2435
48-72	**14**	28	83,000	WS3H	1290	2450
55-104	**18**	36	167,000	WS3H	1370	2690

Autotrol Valves			
Valve	Inlet/ outlet	Drain	HV
255	¾"	½"	200
263	1"	¾"	210
293	2"	1½ "	291

Clack Valves			
Valve	Inlet/ outlet	Drain	HV
WS1	1"	1"	180
WS125	1¼"	1"	180
WS15	1½"	1"	182
WS2	2"	1½ "	217
WS2H	2"	2"	295
WS3	3"	3"	320

Softeners, iron and manganese removal systems are also available as are other medias such as pH correction, sand etc.
Sizes and dimensions are for indication purposes only and may change without notice.