



AC Carb GAC

WASTE WATER TREATMENT ACTIVATED CARBON

Removal of Dissolved Organics

Granular activated carbon (GAC) is a carbonaceous adsorbent with extremely high surface area (upto $1500\text{m}^2/\text{g}$). In waste water treatment; GAC is mainly applied for removal of dissolved organics, notably poorly or non- biodegradable compounds. Waste water is filtrated through the GAC filter bed; once exhausted the GAC is replaced or regenerated (typically offsite). Usually, GAC filtration is a polishing step, being one of the final treatment stages. Proper pre-treatment of the water upstream of the GAC stage is very important; this way, GAC filtration is a very reliable, cost efficient treatment OPTION.

In waste water treatment GAC is typically used in fixed filter beds.

Key design considerations are,

(Feed Flows $>10\text{m}^3/\text{d}$):

- The empty bed contact time (EBCT): In practice varying from 30 minutes up to several hours, depending on the type of waste water and compounds to be removed (see table).
- Backwashing facilities.
- Number of filters in series: for optimal efficiency, 2-3 filters are operated in series and the moving bed principle being applied.
- GAC change-out facilities: connections for filling and emptying GAC filters



Wastewater origin	Parameters of interest	Typical concentration level in GAC feed water	EBCT range(h)	Typical service time (BV)*
Chemical industry	Various Organic	Up to 200mg/l	0.5-2	100-1000
Contaminated ground water	Chlorinated solvents, Mineral oil ,BTEX	Up to 10 mg/l	0.5-1	>3000
Leachate from waste disposal site	COD	100-500mg/l	2-6	100-300

Filling & Backwashing

Filling of filters with GAC may occur either in the dry or wet state. Larger GAC filter vessels are often designed with GAC fill and discharge lines to accommodate slurry loading and unloading (hydraulic transport). Typically, the GAC is loaded directly over the filter nozzles or strainers, on condition that the slot width is appropriate in relation to the GAC particle size. Care should be taken to leave enough space above the GAC bed in order to allow for proper backwashing at 20-30% bed expansion. After filling, the GAC is wetted and backwashed to remove fine sand entrapped air.

Filters should be backwashed at a certain frequency, which mainly depends on the pressure drop increase over time. Backwashing is very important. If not done properly, the filtration and adsorption process are negatively affected. GAC grades are properly backwashed with a 20-25% bed expansion during a 10-15 min. period.

Technical Criteria for GAC selection

- **Adsorption properties:**
Best grade depending on the compounds to be removed; in many cases a cocktail grade is preferred.
- **Mechanical strength:**
Important parameter if exhausted GAC will be thermally reactivated.
- **Pressure drop:**
A lower pressure drop is achieved if the GAC particle size is larger and/or more uniform. Generally, an extruded GAC grade has a very low pressure drop.
- **Back washing rate:**
The required backwashing rate increases with particle size.



Key function/properties of GAC	GAC grade
BOD/COD/TOC/Reactive substances	AC Cocktail Carb 830
Multi-purpose	AC Carb CB830
Standard, low density GAC	AC Carb 3-4mm
Organic micro pollutants	AC Carb CS 830

Service Life

- The GAC service time is preferably expressed in bed volumes (BV) treated: the total number of m³ water treated per m³ of GAC.
- Obviously, the service time strongly depends on the treatment process design and the job which the GAC has to do: type of compounds, concentration level in GAC feed water and treatment target.

Packaging

55lb./110lb. (25/50 kg) poly bag
1,100 lb.(500/550 kg) Bulk bag



For more information on the product, please contact our application specialists at the address below

AC Carb Ltd.

Tel: +44 141 554 6999

E-Mail: info@accarb.com

Website: www.activechar.com

Registered Office :
Orchardwell, Killearn,
Glasgow G63 9QG, United Kingdom





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