



Puri-Teq and our principal specialize in the design and engineering of Odour Treatment Plants (OTPs) using various technologies including BioTrickling Filters, Activated Carbon Filters, Chemical Scrubbing and Regenerative Thermal Oxidisers. The technology adopted is selected and customized for the specific application. Our experiences cover the treatment of odour from Sewage Treatment Plants, Pumping Stations, Sludge Treatment Systems, Waste Management Plants and Food Processing Plants.

WHAT IS ODOUR

Odour is an unpleasant experience of smell (bad smell) stimulated by one or more chemical compound in gaseous form.

Odour is a common occurrence at sewage pumping station, wastewater treatment plants and biosolids facilities. Nuisance odours include Hydrogen Sulphides (H_2S), Mercaptans (CH_3SH) and Volatile Organic Compounds. (VOCs). Hydrogen Sulphide is the most prevalent and noxious odour and it can be detected by humans at level as low as 0.47ppb.

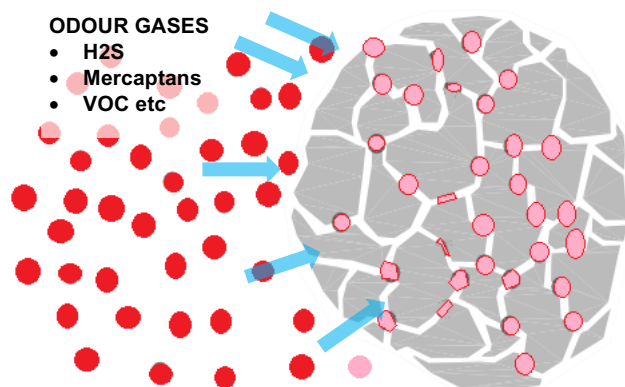


Figure 1 : Adsorption in Carbon Granular

ADSORPTION PRINCIPLE

Granular Activated Carbon is highly effective for removal of low concentration odorants from waste gas. It works with adsorption principle. Each carbon granule consists of a maze of interconnecting channel in which an imbalance of molecular forces exists on internal pore wall surface. Odorant molecules which enter the pores are adsorbed i.e. physically attached to the pore walls. To enable efficient adsorption of odourous gases, the

carbon granules must have high surface area. Molecules are typically adsorbed in pores of range 10 to 2- Angstrom size.

Transition pores of 1000 to 10,000 Angstrom provide the access routes to the adsorption pores. Typically the total surface area of all pores is in the range of 900 to 1,300 square meters per gram of carbon.

Beside adsorbing molecules, the tremendous internal surface area can also provide a surface for chemical reactions to take place. The internal surface can also be impregnated or coated with catalytic material or reactive chemical such as sodium hydroxide or potassium hydroxide. The reactive chemical will selectively react with or “chemisorb” molecules in the gas stream.

TYPES OF ACTIVATED CARBON MEDIA

VIRGIN PELLETISED COAL-BASED ACTIVATED CARBON (VIRGIN-AC)



VIRGIN-AC is a high activity granular activated carbon, manufactured by high temperature steam-activation from selected grades of anthracite coal.

VIRGIN-AC has excellent adsorption capacities for a variety of air purification and vapour phase applications, such as odour and VOC control, emission control and many more.

VIRGIN-AC has a large internal surface area and the optimised balance pore structure enables to provide rapid adsorption kinetics and a high loading capacity. It has an excellent hardness and low dust and has low pressure drop characteristics.

IMPREGNATED ACTIVATED CARBON (IMPREG-AC)

IMPREG-AC is an enhanced impregnated activated carbon for acid gas removal. It used a unique formulation to provide improved performance over traditional impregnated activated carbons.

Displaying high density, superior hardness, large pore volume and high sulfur loading capacity, IMPREG-AC provides excellent adsorption capacity at an economical cost. It is available in both extruded pellet form for the larger filters and granular form for smaller and specialty application.

It has been developed for the adsorption of hydrogen sulfide, organic mercaptans, certain organic sulphides, sulfur dioxide, general acid gases and many other odours and contaminants found in a variety of applications including biogas plants, sewage works, pulp, mills and chemical plants.

CATALYTIC EXTRUDED ACTIVATED CARBON (CE-AC)

CE-AC is an advanced catalytic activated carbon with excellent adsorption capacities.

It offers rapid adsorption kinetics for sulphurous compounds including H₂S and has an excellent sulphur loading capacity. The typical loading capacity is 0.30g/cc H₂S, providing a long service time. The service time can be increased by the capability of water wash regeneration.

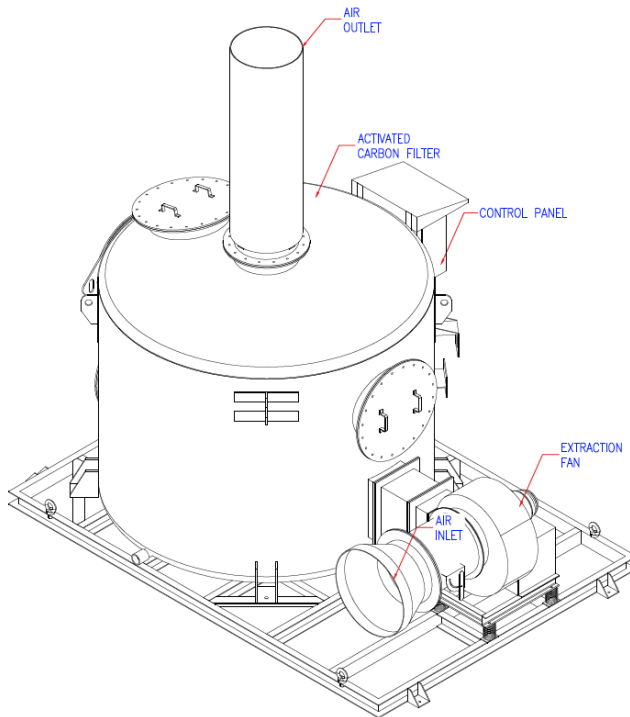
CE-AC suitable for both rich and poor oxygen environments. It has an excellent hardness and low dust, offering easy filter loading.

CE-AC is a high performing and versatile premium product and is typically employed in applications where high-performance removal of sulphur is required.

Reference: Carbon Activated

VERTICAL ACTIVATED CARBON FILTER

PACKAGED ACTIVATED CARBON FILTER UNIT (PACV-SERIES)



Based on chemical absorption, Activated Carbon is able to remove Low-Level Odour contaminants and impurities from Sewage Odour. The requirement of air leakages and FRP fabrication will be based on AMCA, ASTM, NBS-PS-69 and other international standards.

- >99.5% of H₂S remove efficiency
- High contact time with filter bed
- Minimal pressure loss through optimize filter vessel design
- Complete package design with Fan/Blower, Dampers, Fiber-Reinforced Plastic (FRP) Ductworks and other auxiliary components

1) **FIBERGLASS-REINFORCED PLASTICS (FRP) VESSEL, DUCTING & FITTINGS**

Fabricated from Fiberglass-Reinforced Plastics (FRP). It is proven for high resistant for odourous gas. FRP ductwork are based on NSB PS 15-69 and ASTM D3299.

2) **AIR SEALED DAMPER & VOLUME CONTROL DAMPER**

Option to include AMCA Certified Damper to complied to AMCA Leakage Teat of maximum Leakage Rate of 1.5m³ per min per m² of damper area, at a differential pressure of 7kPa.

3) **AMCA CERTIFIED FRP BLOWER / FAN**

Option to include AMCA Certified FRP Blower/Fan. Prior to assembly, the wheel and shaft shall be dynamically balanced in accordance to ISO Quality Grade G2.5. The fan is then balanced to ANSI/AMCA Standard 204 after assembly. Vibration levels to be less than 0.10 in/sec at the inboard and outboard bearings, horizontal and vertical planes, and filter in at the fan speed, fan rigidly mounted.

FEATURES OF THE PACV SERIES CARBON FILTER

CHEMICAL RESISTANT CONSTRUCTION MATERIAL

The carbon vessels and structural components are usually fabricated from fiberglass reinforced plastics (FRP). The vessels are constructed to handle the various acid gases, moist air and regeneration chemicals. Resin is selected from premium grade vinyl ester. All FRP fabrication meet the requirements of ASTM D3299 for filament winding and NBS PS 15-69 for contact moulding.

LOW PRESSURE LOSS

Each filter is carefully engineered and carbon selected for lowest pressure loss.

DETECTION OF TEMPERATURE RISE

Each filter is equipped with temperature sensor to detect a temperature rise in activated carbon bed. A water spray system inside vessel can be also included as optional.

SAMPLING PORT

Each bed is provided with sampling ports which protrudes 300 mm into the carbon bed. Isolation ball valves are provided at the end of each sampling ports.

GROUNDING RODS

Grounding rods to dissipate any possible static charge which may build up in the FRP vessel during dry operating conditions.

AIR DISTRIBUTION

Unique carbon support system with inlet air distributor to ensure equal air distribution over carbon bed. Computer Flow Modelling services are available.

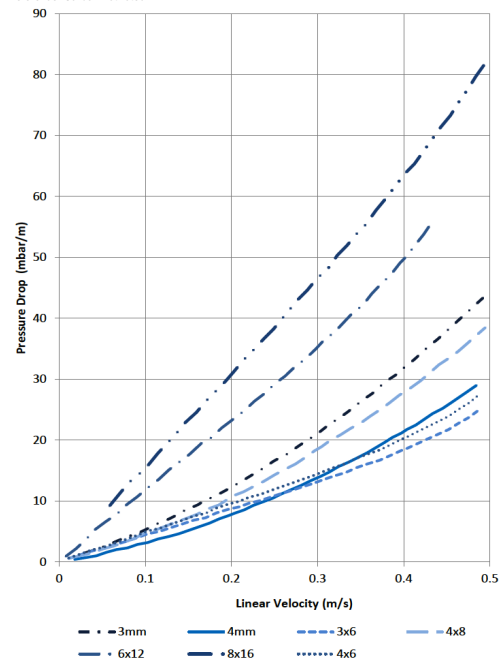
MULTIPLE MAINTENANCE ACCESS

Multiple access manways to permit safe filling and emptying of the vessel

APPLICATION ASSISTANCE

You benefit from expert guidance in the selection of carbon absorbers. You are backed by trained engineers.

Comparison of gas/vapour phase carbons at 20°C & 1.013 bar
Reference: Carbon Activated



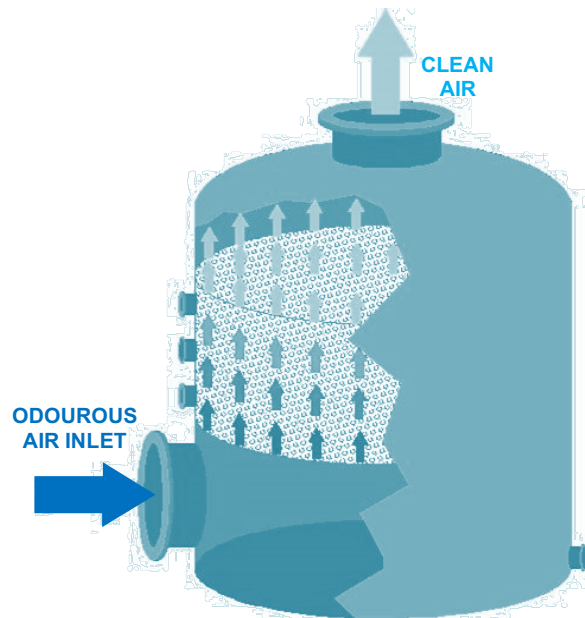
CARBON ACTIVATED PRESSURE CURVE

PURI-TEQ OdoSorb-V

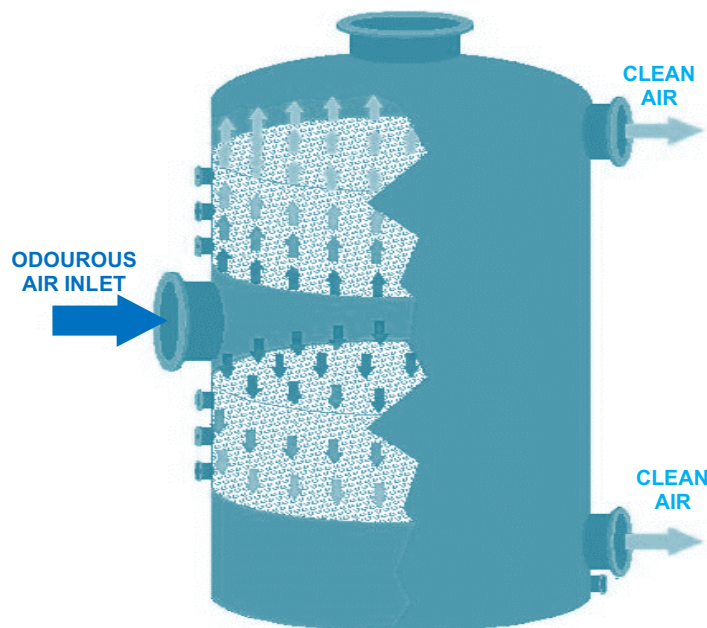
VERTICAL ACTIVATED CARBON FILTER

ARRANGEMENT OF ACTIVATED CARBON FILTERS:

Single bed units are available for airflow below 11,300 m³/h



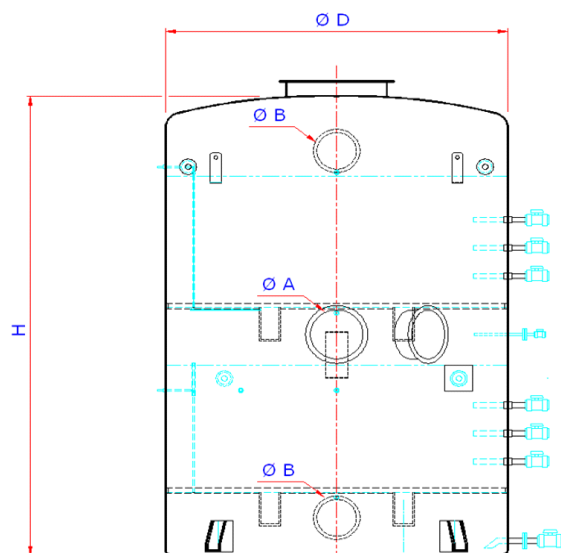
Dual bed units are available for airflow of 11,300 m³/h and above. It offers maximum capacity with minimal space.



PURI-TEQ OdoSorb-V

VERTICAL ACTIVATED CARBON FILTER

GENERAL DIMENSIONS OF PACV-SERIES



DIMENSIONS OF
STANDARD MODELS

D = Filter Internal Diameter

H = Vessel Height

A = Air Inlet Diameter

B = Air Outlet Diameter

PACV SINGLE BED UNIT

MODEL	Capacity (m ³ /hr)	D (MM)	H (MM)	Inlet (MM)	Outlet (MM)
PACV-1900S	1,900	1,500	2,050	300	300
PACV-3400S	3,400	2,000	2,150	400	400
PACV-5300S	5,300	2,500	2,350	500	500
PACV-7600S	7,600	3,000	2,450	550	550
PACV-10400S	10,400	3,500	2,500	600	600
PACV-13600S	13,600	4,000	3,000	700	700

PACV DUAL BED UNIT

MODEL	Capacity (m ³ /hr)	D (MM)	H (MM)	Inlet (MM)	Outlet (MM)
PACV-15000D	15,000	3,000	4,500	700	550
PACV-20000D	20,000	3,500	4,800	800	600
PACV-27000D	27,000	4,000	5,000	1,000	700