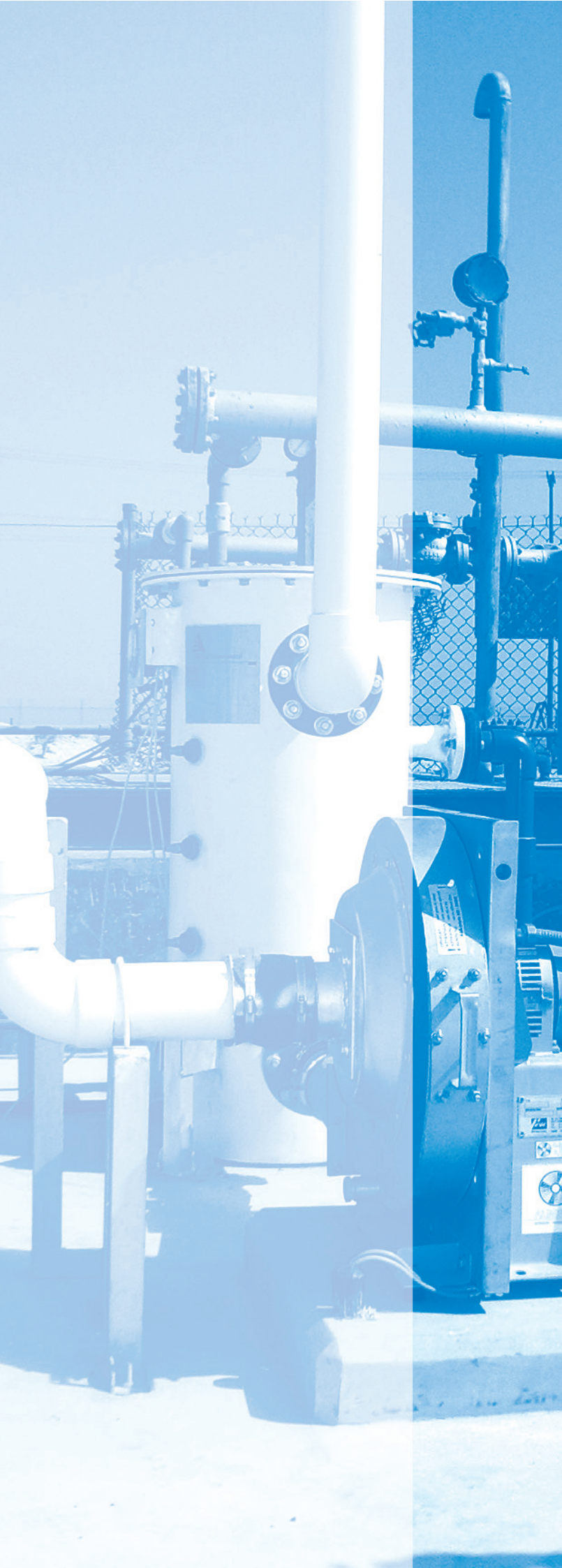




AmTrad Environmental

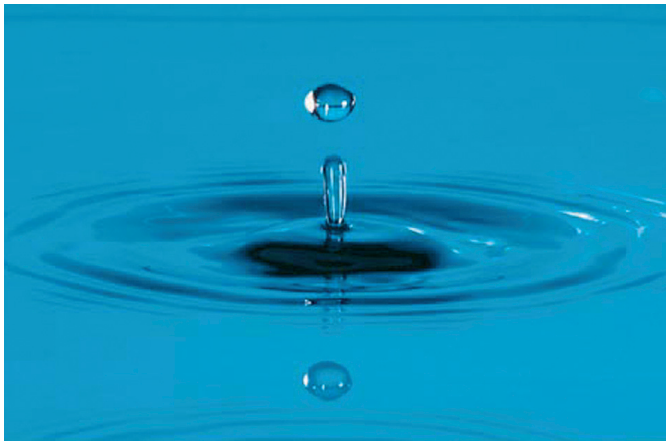


COMPANY INFORMATION

AmTrad Environmental is a specialist in the production and supply of activated carbon with over 30 years of experience in the industry. AmTrad Environmental not only supplies the activated carbon, but also has the knowledge and experience to be able to supply the engineering and equipment needed for activated carbon installations used in the treatment of liquids and gases.

AmTrad Environmental puts this knowledge and experience to the benefit of the customer in order to solve problems. Using worldwide sourcing of activated carbon products AmTrad Environmental can ensure the right choice of carbon type at the best price.

AmTrad Environmental guarantees that its activated carbon products are of an excellent and consistent quality. All products are quality controlled twice before being shipped, once at the production site and once at the central warehousing and dispatching facility. Any batch that is not fully within specification is not shipped.



AmTrad Environmental provides a complete solution to odour control problems. Whilst the main abatement technology used by AmTrad Environmental is based on adsorption/chemi-sorption using activated carbon, other technologies, for example wet chemical scrubbing, can also be provided.

AmTrad Environmental can provide custom-designed abatement solutions using a variety of technologies that maximize efficiency, minimize operating costs and, most importantly, solve the odour problem.



ACTIVATED CARBON

AmTrad Environmental supplies a wide range of granular, pellet and powder activated carbons manufactured from bituminous coal, wood and coconut shells. In addition to the standard grades we can also supply acid washed, impregnated or catalytically active products. The products come in a range of sizes and are optimised for different applications. The properties of the three main categories are outlined below:

Granular

Irregular shaped particles with sizes ranging from 0.2 to 5 mm and with a wide-ranging adsorption capacity. This type of carbon is used for different applications in drinking, process and wastewater treatment. Acid washed versions of some products are available for the purification of low pH liquids or where very high purity is demanded. Large size granular products are used extensively in gas phase applications where the product can be either impregnated or non-impregnated depending upon the application.

This list is not complete and gives only the most common carbons. Other types are available upon request.



Parameter	Units	GAC 100	GAC 300	GAC 400	GAC 400 AWD
Density	g/ml	0.5 min	0.53 max	0.5 max	0.5 max
Moisture	%	< 2.0	< 2.0	< 2.0	< 2.0
Iodine No.	mg/g	> 850	> 950	> 1000	> 1000
Hardness No.		> 90	> 90	> 90	> 90
Mesh Size	U.S. mesh	12 x40	8 x 30	12 x40	12 x40

ACTIVATED CARBON

Pellet

Extruded activated carbon and cylindrical in shape with diameters ranging from 0.8 to 5 mm. These are mainly used for air and gas phase applications because of their low pressure drop, high mechanical strength and low dust content. These products can be impregnated to give enhanced removal of inorganic substances such as hydrogen sulphide, mercury, etc.

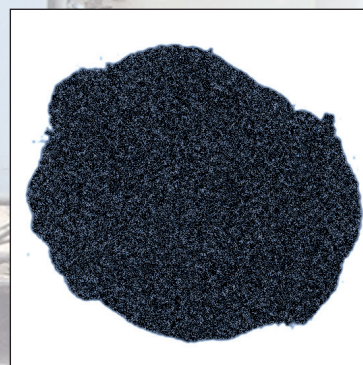


This list is not complete and gives only the most common carbons. Other types are available including impregnated carbons for odour control and mercury removal.

Parameter	Units	APP
Density	g/ml	400 - 600
Carbon Tetrachloride	%	> 60
Hardness		> 95
Pellet Diameter	mm	2 - 5

Powder

A range of powder activated carbons suitable for a wide range of applications including drinking and waste water treatment, purification and decolourisation of liquids. A number of different activities, size ranges as well as acid washed versions for very high purity applications are available.



This list is not complete and gives only the most common carbons. Other types are available upon request.

Parameter	Units	PAC 100	PAC 300	PAC 400	PAC 400 AWD
Iodine No	mg/g	> 850	> 950	> 1000	> 1000
Moisture	%	< 10	< 10	< 10	< 10
Mesh size	< 200 mesh	> 90%	> 90%	> 90%	> 90%

ODOUR CONTROL TECHNOLOGIES

Activated Carbon Systems

AmTrad Environmental's range of deep bed Odour Control Filters (OCF's) containing either impregnated or catalytic activated carbons achieve efficient odour control where the incoming level of hydrogen sulphide is below 15–20 ppmv. The units are designed to handle air flows from 2,500 m³h⁻¹ up to 35,000 m³h⁻¹ and where higher flows are required multiple units can be arranged in parallel.

The OCF system consists of an adsorber containing a single bed or, for higher flow rates, a double bed of granular activated carbon. The carbon that is used in the OCF has been specially developed for odour removal from sewage treatment operations. A key feature of the carbon is that it can be chemically regenerated in-situ with either an alkaline solution, in the case of the impregnated carbons, or water, in the case of the catalytic carbons.

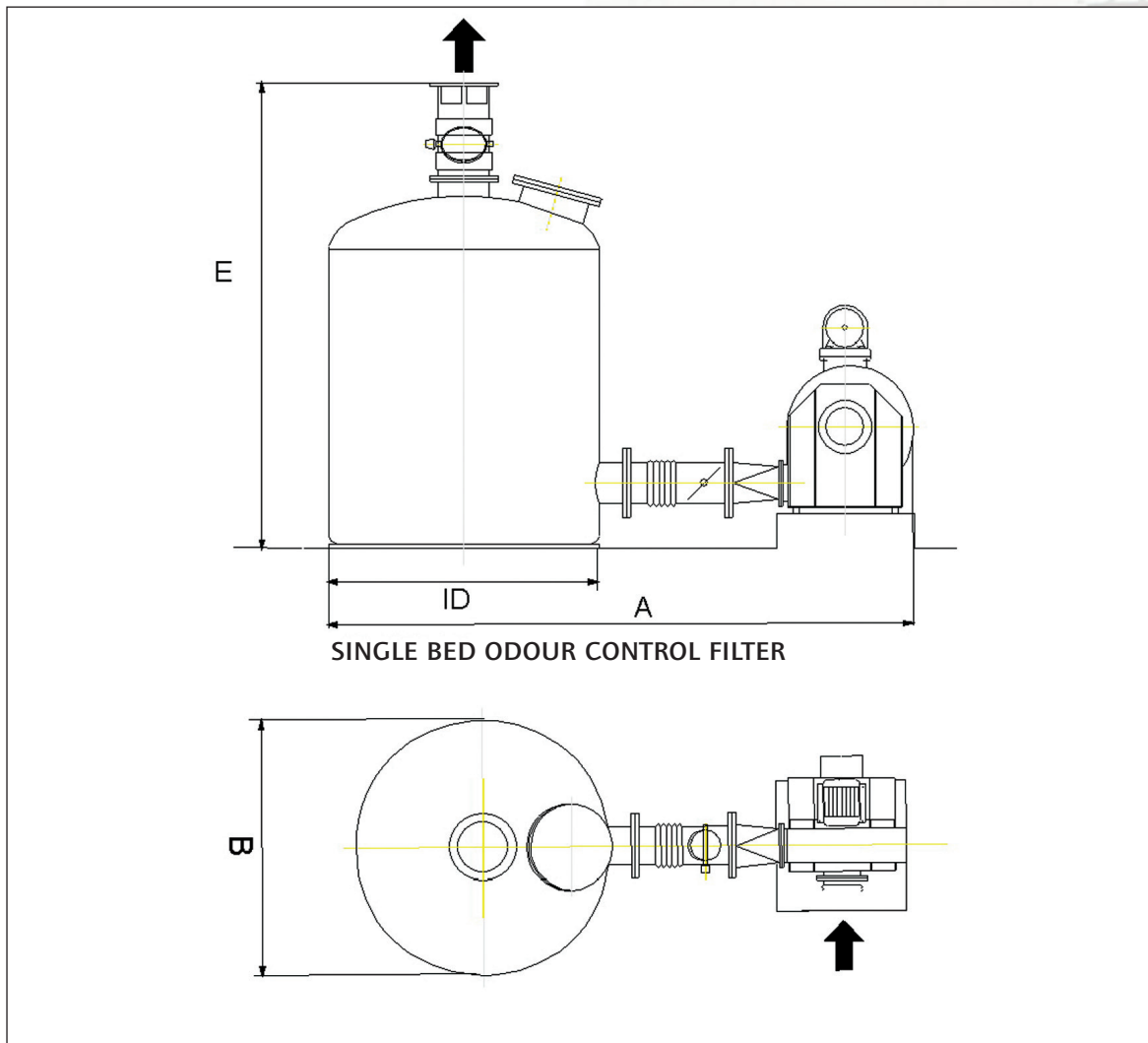
Air is blown into the bottom of the vessel and flows upwards through the carbon bed in the case of single bed OCF's. For the OCF double bed, air is blown into the middle of the vessel and flows downwards through the lower carbon bed and upwards through the upper carbon bed.

The air discharges to atmosphere via the top outlet nozzle(s). As the air passes through the carbon bed the contaminants are removed and clean, odour free air exits the unit via the chimney(s).

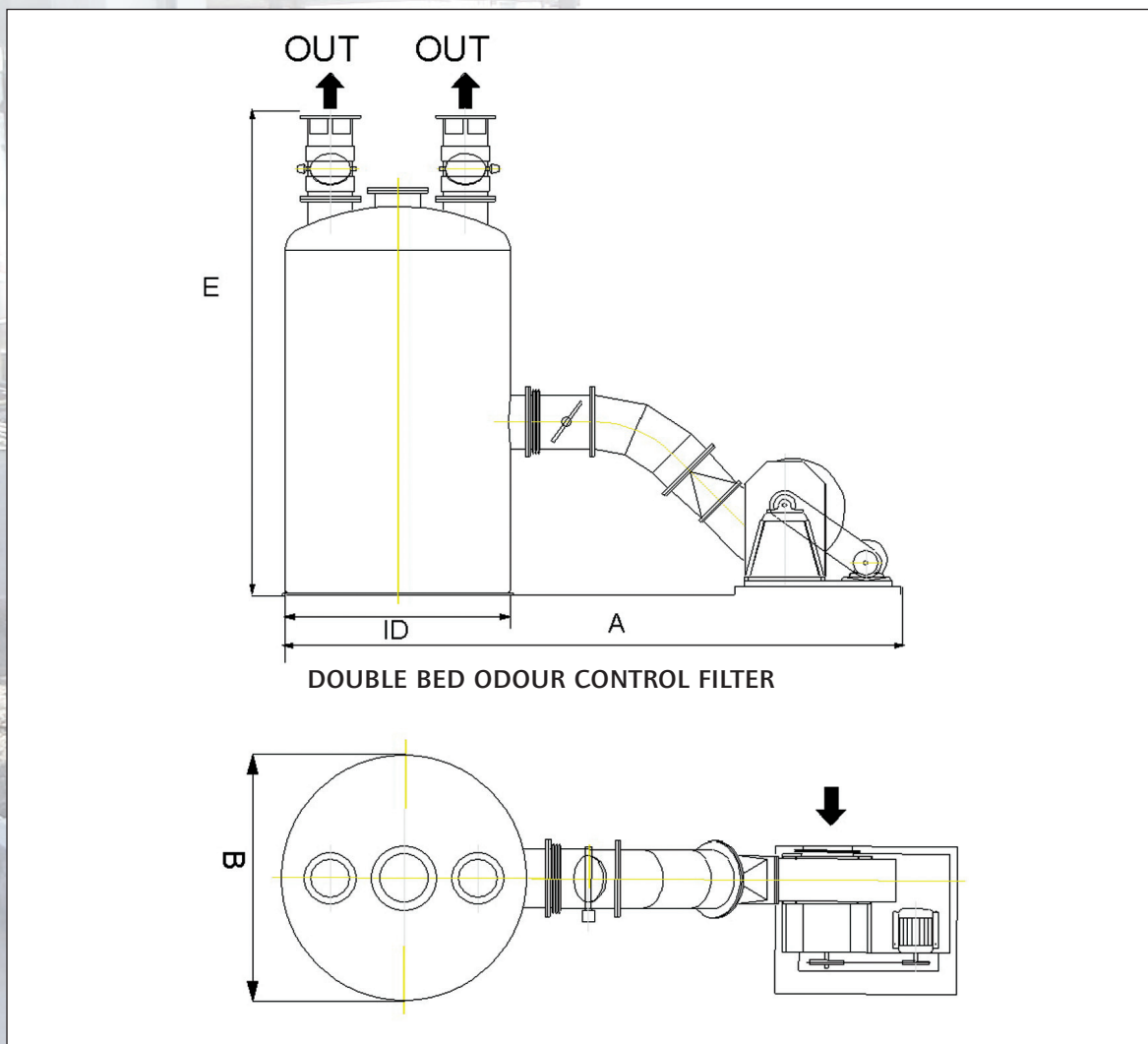
The system is supplied complete with activated carbon, a fan and motor set, and interconnecting ductwork between the fan and the adsorber. Also supplied is the regeneration piping, including the overflow and drain connection, blind flanges and gaskets. Instruments include a differential pressure gauge(s) and one H₂S monitor sensitive for a range from 0.5 ppmv to 20 ppmv.



OCF Range	1000 S	3000 S	5000 S	8000S	12000 S	16000 S
Total Air Flow, max. (m ³ h ⁻¹)	1300	3500	5500	8500	12200	16600
Nominal Carbon Vol. (m ³)	0.73	1.87	2.89	4.42	6.46	8.67
Weight of Carbon (kg)	410	1100	1800	2700	3900	5200
Superficial Contact Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Piping for Regeneration (DN)	50	50	50	65	80	80
Inside Diameter of Vessel (mm)	1,000	1,600	2,000	2,500	3,000	3,500
Overall Height [E] (mm)	2,025	2,850	3,130	3,230	3,530	3,630
Overall Width [B] (mm)	1,450	1,900	2,300	2,800	3,300	3,800
Overall Length [A] (mm)	2,745	3,800	4,300	4,900	6,000	6,600
Vessel Flanges Inlet (DN)	200	300	300	400-500	500-600	600-700
Vessel Flanges Outlet (DN)	200	350	350-400	500	500-600	600-700
Total Empty Wt (kg)	750	1,500	2,150	3,300	4,700	6,300
Operating in Regeneration Wt (t)	2.5	5.8	9.2	14.2	22	29.7
Motor Rating (kW)	4	5	7.5	11	15	18.5



OCF Range	7000 D	11000 D	17000 D	24000 D	33000 D
Total Air Flow, max. (m ³ h ⁻¹)	7000	11000	17000	24400	33250
Nominal Carbon Vol. (m ³)	3.74	5.78	8.84	12.24	16.66
Weight of Carbon (kg)	2,200	3,500	5,300	7,400	10,100
Superficial Contact Time (s)	1.9	1.9 - 3.0	1.9 - 3.0	1.9 - 3.0	1.9 - 3.0
Piping for Regeneration (DN)	50	50	65	80	80
Inside Diameter of Vessel (mm)	1,600	2,000	2,500	3,000	3,500
Overall Height [E] (mm)	4,300	4,620	5,100	5,100	5,400
Overall Width [B] (mm)	1,960	2,300	3,000	3,300	3,800
Overall Length [A] (mm)	3,800	4,980	5,720	9,000	9,800
Vessel Flanges Inlet (DN)	400	500	600	800	900
Vessel Flanges Outlet (DN)	350	400	500	600	700
Total Empty Wt (kg)	3,000	4,300	6,600	8,900	12,000
Operating in Regeneration Wt (t)	12	18	28	30.5	42.7
Motor Rating (kW)	11	15	17	30	37



Where it is necessary to treat smaller flows the AmTrad Environmental LO-FLOW systems can be conveniently used. These have been designed for the purification of flows ranging from 250 m³h⁻¹ up to 2,500 m³h⁻¹ and as with the larger OCF systems the design of the LO-FLOW units allow the carbon to be regenerated in-situ.

The contaminated air is blown into the bottom of the container and flows upwards through the carbon bed and discharges to atmosphere via the top outlet nozzle. As the air passes through the carbon bed the contaminants are adsorbed. Once the carbon is no longer able to remove the incoming hydrogen sulphide to the desired level the carbon can be regenerated.

The regeneration procedure involves either water washing or washing with alkaline media (depending upon the carbon in use) and is available upon request.

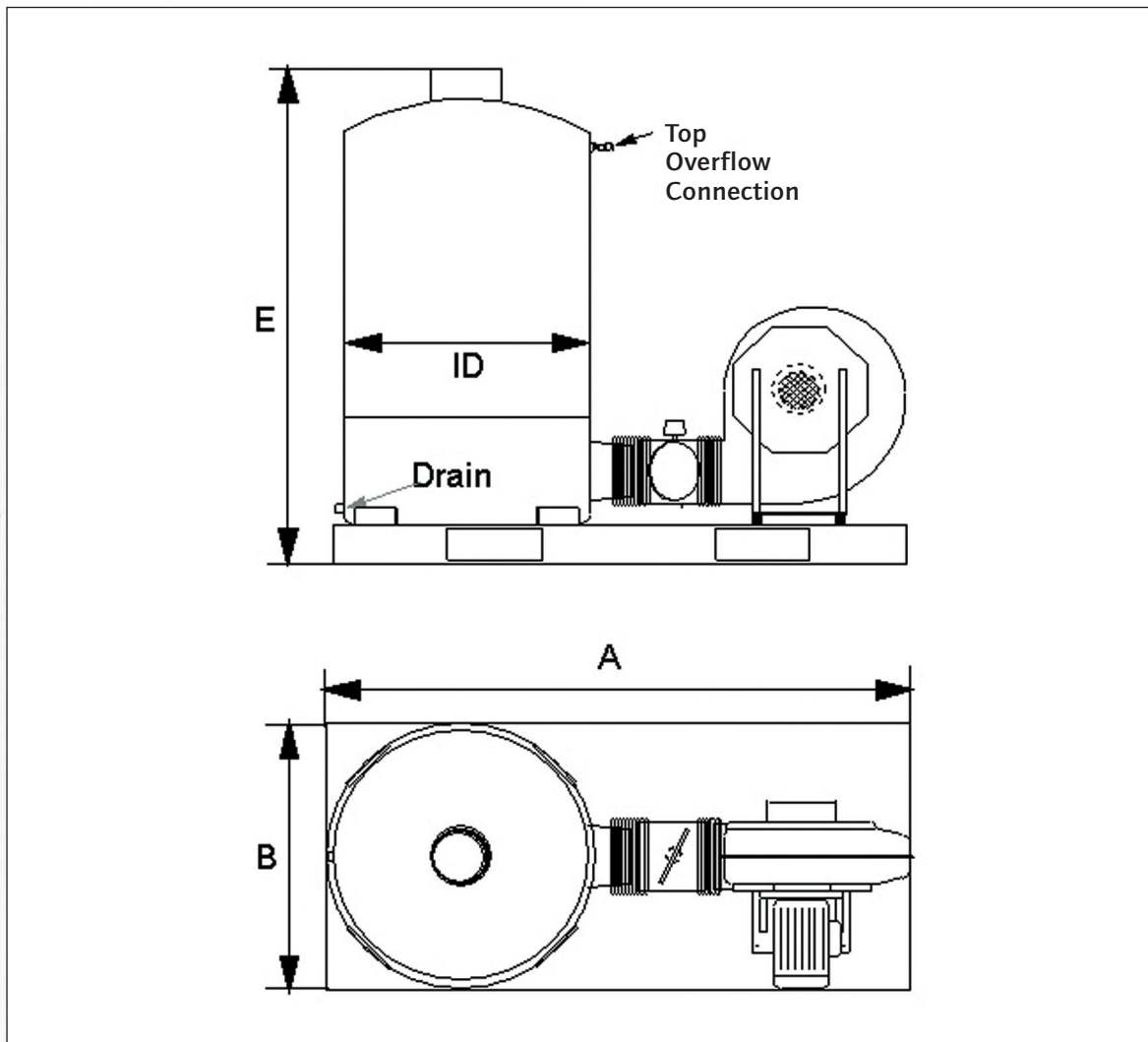
The LO-FLOW adsorber vessel is a vertical cylinder fabricated in UV resistant HDPE and has a flat bottom and a removable top. The unit is supplied mounted on a corrosion resistant skid and is complete with a direct drive electric fan (400-680V, 3 ph, IP55) and interconnecting ductwork between the fan outlet and the vessel inlet.

There is also a 20mm bottom regeneration liquid/drain manifold and a 25mm overflow connection.

The process contact materials are polyethylene, polypropylene and polyester that have been selected for their good corrosion resistance to a wide range of organics, hydrogen sulphide, mercaptans and acids etc.



LO-FLOW Range	250	500	1000	1500	2000	2500
Total Air Flow, max. (m ³ h ⁻¹)	250	500	1000	1500	2000	2500
Nominal Carbon Vol. (m ³)	0.14	0.28	0.57	0.86	1.1	1.4
Weight of Carbon (kg)	100	200	400	600	700	800
Superficial Contact Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Inside Diameter of Vessel (mm)	450	630	900	1100	1250	1400
Overall Height [E] (mm)	1350	1550	1800	1900	2000	2100
Overall Width [B] (mm)	1000	1000	1000	1200	1310	1460
Overall Length [A] (mm)	1200	1200	1200	2000	2000	2130
Fan Inlet Diameter (mm)	160	170	200	200	225	250
Vessel Outlet Diameter (mm)	160	180	200	200	225	250
Motor Rating (kW)	0.37	0.75	1.5	1.5	2.2	4.0



Activated Carbon Types

Two types of activated carbon are available with our systems; traditional impregnated carbon or non-impregnated catalytic carbon. Once exhausted both types of carbon can be regenerated whilst still in the vessel in order to recover the hydrogen sulphide removal capacity. Some general properties of the activated carbons are shown in the table below;

Parameter	Units	Impregnated	Catalytic
Density	g/ml	–	0.56 - 0.65
Hydrogen sulphide capacity	mg H ₂ S/g carbon	> 0.14	> 0.14
Hardness No		> 95	> 98
Mean Particle Diameter	mm	3.6	4
Impregnant		NaOH	None
Regeneration Fluid		NaOH	Water

Materials of Construction

The use of corrosion resistant materials (polypropylene, PVDF, glass reinforced polyester (GRP), PVC, etc.) combined with stainless steel or coated carbon steel, make our systems both reliable and cost effective.



Wet Chemical Scrubber Systems

AmTrad Environmental's range of wet chemical scrubbers are designed for odour control where the incoming level of hydrogen sulphide exceeds 15–20 ppmv. Removal efficiencies in excess of 99% are routinely achieved for hydrogen sulphide and ammonia.

The scrubbing system consists of one or more vertical or horizontal towers filled with an inert packing media. Above the packing the scrubber liquor is introduced at an even and constant rate over the full cross section of the column. The liquor passes downwards, counter-current to the gas stream to the integral sump, located in the bottom of the scrubber vessel.

Within the layer of packing the gaseous contaminants are absorbed into the liquid phase and removed from the gas stream. The large gas/liquid contact surface area provided by the packing elements aids this process. Within this section the odorous compounds will be removed by forming salts, which are then removed in the bleed line. The liquor is re-circulated to the top of the packing from the integral sump, via the re-circulating pumps.

The chemical condition of the scrubber liquor is monitored by a pH/redox control system consisting of a pH/redox probe and electronics. The probes will be located in the re-circulation pipe-work after the reagent injection points and this will ensure that the liquor presented to the top of the packing will always be at the optimum chemical make up.

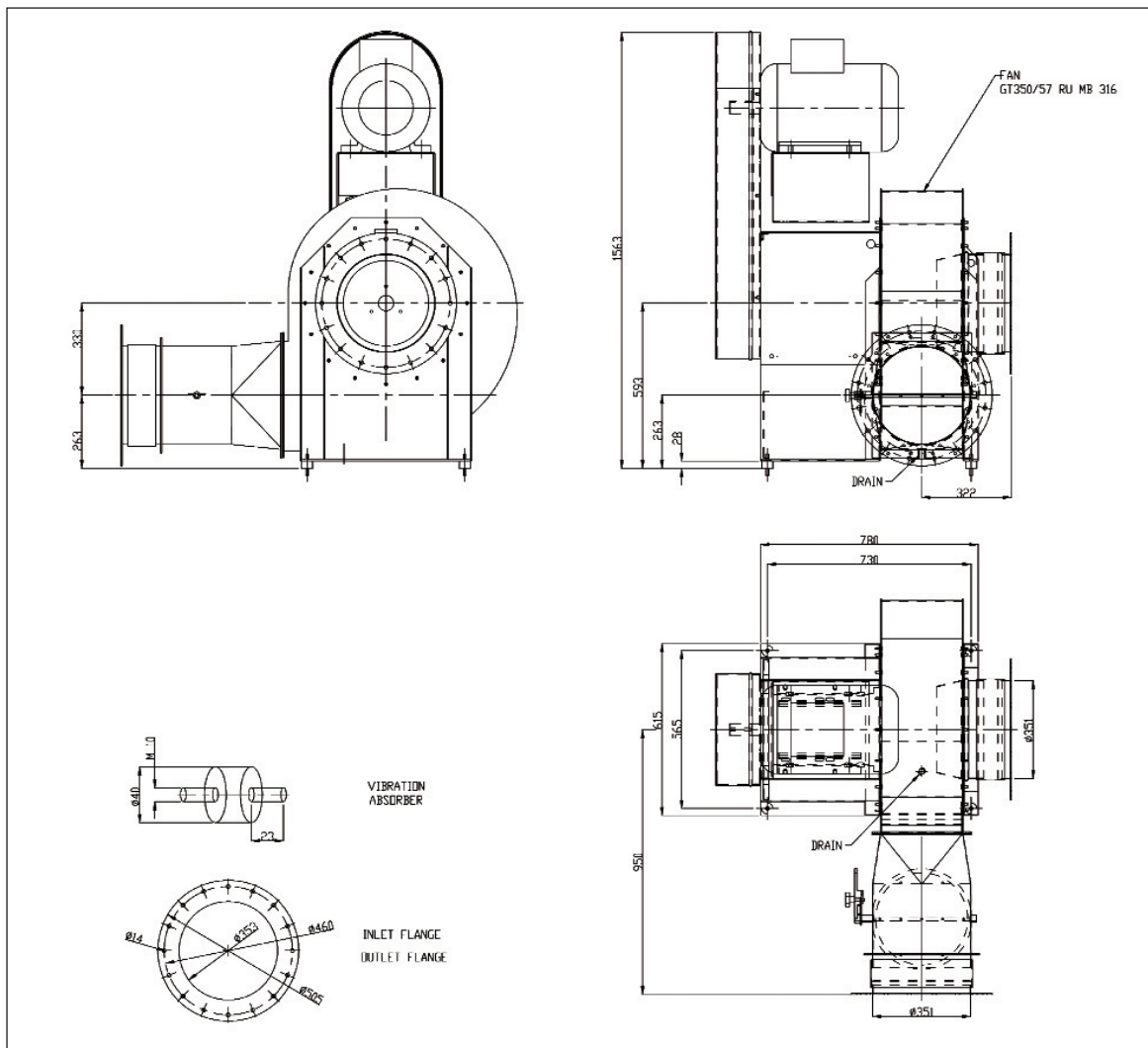
The system is supplied complete with packing media, a fan and motor set, interconnecting ductwork between the fan and the first tower and between the towers. Also supplied are the liquid re-circulation pumps and associated piping, including the filling overflow connections, and gaskets. Instruments include a differential pressure gauge and one pH/redox monitoring system per installed tower.

Where required an activated carbon system can be used to polish the final emission from the wet scrubber to improve the overall system performance.

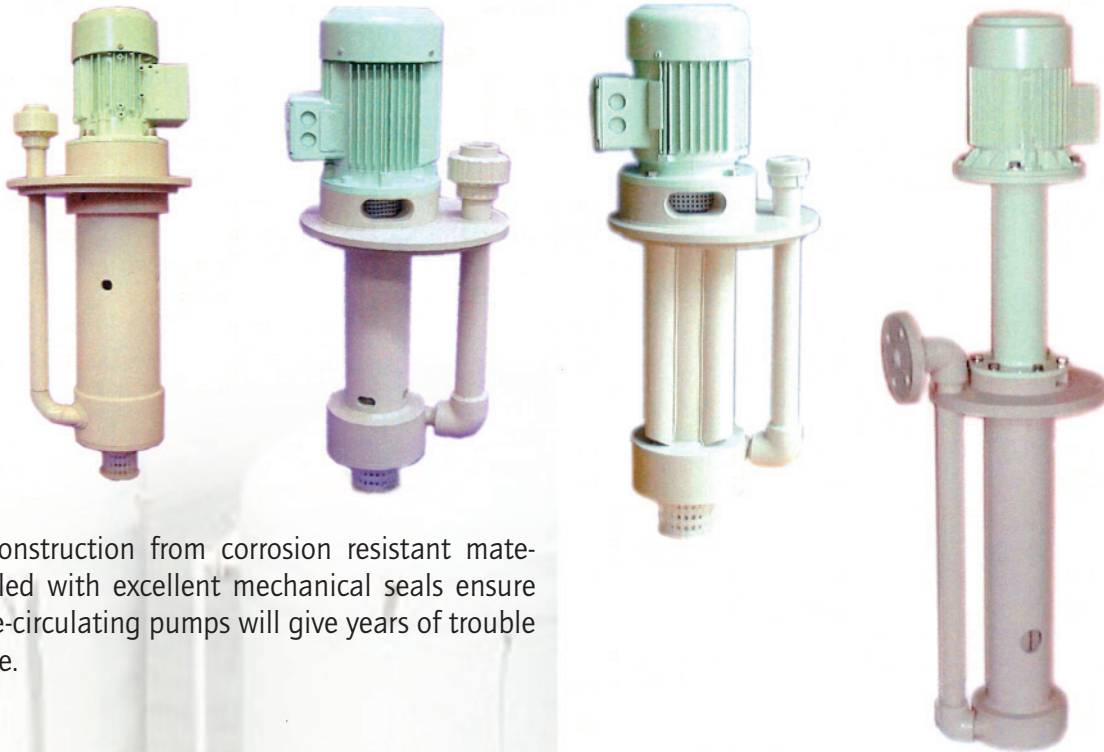


Fans

All of our fans are constructed in corrosion resistant material specially selected for the application. Each fan is custom designed and fabricated and is available with direct drive or indirect drive.



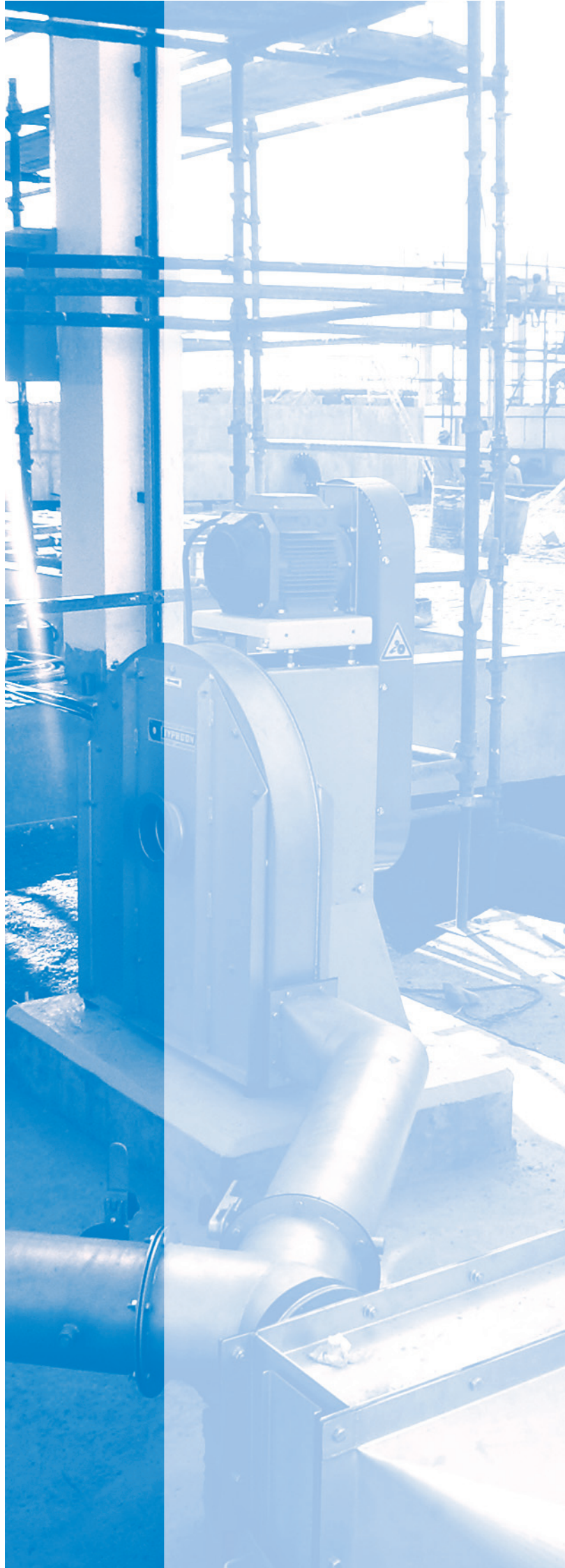
Re-Circulating Pumps



Rugged construction from corrosion resistant materials coupled with excellent mechanical seals ensure that our re-circulating pumps will give years of trouble free service.

Packing Media

A variety of different shaped packing media fabricated in a range of plastic materials are available. With active surface areas ranging up to 300 square metres per cubic metre of packing our packing ensures unrivalled gas/liquid contact.





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