



## HS-Securesorb Activated Carbon Adsorber



HS-Securesorb is designed to handle and filter high airflows (5.000 to 15.000 m<sup>3</sup>/h) which contain gaseous or toxic impurities. The highly efficient System contains an air heater, particle and adsorption filter as well as a final filter stage to securely trap any contaminated carbon abrasion dusts.

For the carbon to work most efficiently, the relative air humidity should be relatively low. In order to accomplish this status, an air heater can be installed at the air intake side. As pre-filtration elements the following filters may be offered: fine dust filter, filtration class ISO ePM10 - ISO ePM1 (e.g. HS-Makro 95), HEPA Filter, filtration class EN 1822: H13 or H14 (e.g. HS-Mikro S). Particulate matter filters protect the adsorption layer of dust, aerosols, and particles. The filtration units can be changed without contamination (Safe Change, refer to page 1/D11). The adsorption layer, which adsorbs gaseous impurities, is fabricated out of activated carbon.

Its charging depth as well as the type of carbon depends on the requirements (e.g. necessary time of contact, volume of air stream, or differential pressure).

The adsorption range includes the filtration of odours as well as hazardous substances (for example solvent, or phosphate), gaseous radionuclide, and warfare agents.

The carbon packed bed (PB) is filled via a spacious aerial platform, which also serves as reservoir for follow-ups. In order to eliminate bypasses the activated carbon should be compressed through a vibrator after being placed inside the PB. Used up carbon can be discharged contamination by safe change (aka. Bi-Bo, Bag-In-Bag-Out).

The final stage in this system is a security filtration element, containing a HEPA Filter of filter class EN 1822: E11 or better. This stage makes sure that none of the carbon particles will pollute the air, which may escape while filling the PB.

Pressure relief units at various parts of the case ensure a safe contamination-free pressure equalization prior to maintenance. The flow of any gas while opening the maintenance covers will therefore be controlled. The case is fabricated from stainless steel (grade 1.4301) or better. The surface was bead blasted, and therefore can easily be decontaminated.

HS-Luftfilterbau will take the system apart for transportation. It can be put back together easily at your facility. Any connectors to channels and ductwork will be designed according to your specifications.

### Technical data according to the design

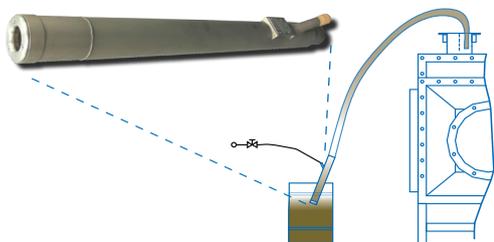
nominal air flow	5.000 - 15.000	[m <sup>3</sup> /h]
pressure drop	500 - 2500	[Pa]
carbon volume	500 - 1000	[Ltr.]
depth of the packed bed	100 - 300	[mm]
height of the hopper	100 - 300	[mm]
weight (stainless steel 1.4301)	900 - 1600	[kg]
performance of the air heater	10 - 20	[kW]
sample taking system	sample taking lance, bottle rack, fixed bypassprobe (3 - 5 Samples)	

### Evaluating the carbon condition

In order to check the carbon's adsorption capacity, one has to either determine the weight or analyze a sample. HS-Luftfilterbau offers various systems for taking samples:

<b>Sample taking lance</b>	This instrument can be plunged into the packed bed (PB) through an inspection flap. Through a closable opening the carbon is directly taken from the carbon bed.
<b>Bottle rack</b>	Gas-tight bottles and a ball stop-cock enable service personnel to take the sample directly from the packed bed (PB).
<b>Bypassprobes</b>	A fixed amount of probes are aligned with the filtered airflow. Single samples can be taken and tested for their efficiency. The amount of inspections is limited to the amount of bypass samples (appx. 3 to 5).

With the taking of samples with the sample lance and bottle rack carbon will move up from the hopper reservoir.



### Filling of Activated Carbon Packed bed (PB)

The PB will usually be filled with the HS-injector system. A circular nozzle venturi injector, made from standard carbon bins or Big-Bags, sucks the carbon directly into the PB. Different from common worm/snail type feeders this injector system delivers the carbon into its encasement without crushing the granules.

## Exemplary design

HS-Securesorb Filter will be designed according to your specifications and environments. The example design reflects a modular system which is split in a series of separate modules for better transport and installation. All single parts are gastight welded by our certified welders on the installation site.

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|----------------------------------|---|---|
| <b>1.</b> air heater             | <b>5.</b> diverse probe ports (aerosol, pressure drop etc.) | <b>8.</b> hopper / reservoir                    |
| <b>2.</b> aerosol filter stage   | <b>6.</b> passage to adsorption filter                      | <b>9.</b> discharger (gas tight ball-stop-cock) |
| <b>3.</b> pressure relief filter | <b>7.</b> adsorption filter stage                           | <b>10.</b> abrasion filter stage                |
| <b>4.</b> carbon probing port    |   |   |



<b>Air heater</b>	To facilitate the most favorable efficiency, the carbon is not supposed to be placed in environments with more than 70 percent humidity. Therefore air heater can be placed at the air ingress sides upon request.
<b>Measure points</b>	Measuring points and sensors for checking the pressure difference may also be equipped upon request.
<b>Pressure relief filters</b>	By integrating a pressure relief equipment the system can be operated even with negative pressure to avoid contamination while maintenance. Any system pressure difference can be safely equalized with the ambient atmosphere before taking off the maintenance covers.
<b>Vibrators</b>	Pneumatic vibrators can optionally be placed at the case to avoid bypasses when filling the PB. The controlled vibrations ensure an equally compressed carbon PB.
<b>Gastight dampers</b>	We recommend our proven gas-tight dampers to securely shut off the filtersystem while not in operation or for maintenance. The tightness of the shut damper can be proven through various test methods.



**Discharging of the activated carbon packed bed**  
The carbon's encasement is being emptied through a gas tight ball stop-cock at the reservoir at the bottom of the case. Optional the discharging can be done through an automatic system (e.g. gas-tight worm type feeder or mobile extraction system with injector mechanism). If required a maintenance board for Safe-Change Bags can also be equipped.