



100 cfm

HDB™/HECA™ Range

20,000 cfm

HDB™/HECA™ DEEP BED ADSORBERS

Barnebey Sutcliffe® deep bed activated carbon adsorbers are designed for greater than 99.9% removal of corrosive gases, volatile organic compounds (VOC), odors, and other hazardous chemical applications where high air flow or high contaminate concentrations exist. To minimize service costs, deep bed adsorbers are sized to provide an approximate annual quantity of activated carbon for the removal of specified contaminants.

Configurations

The standard configuration for a deep bed carbon adsorber is a horizontal bed (HDB) of 2 to 5 feet deep. To assist in long fan life, systems are designed to pull air through the bed and are generally equipped with pre- and post-particulate filters. For applications where a minimum equipment footprint and/or low pressure drop is needed, we also offer our HECA deep bed carbon adsorber, which utilizes vertical bed design. Standard dimensions and pressure drop data are provided.

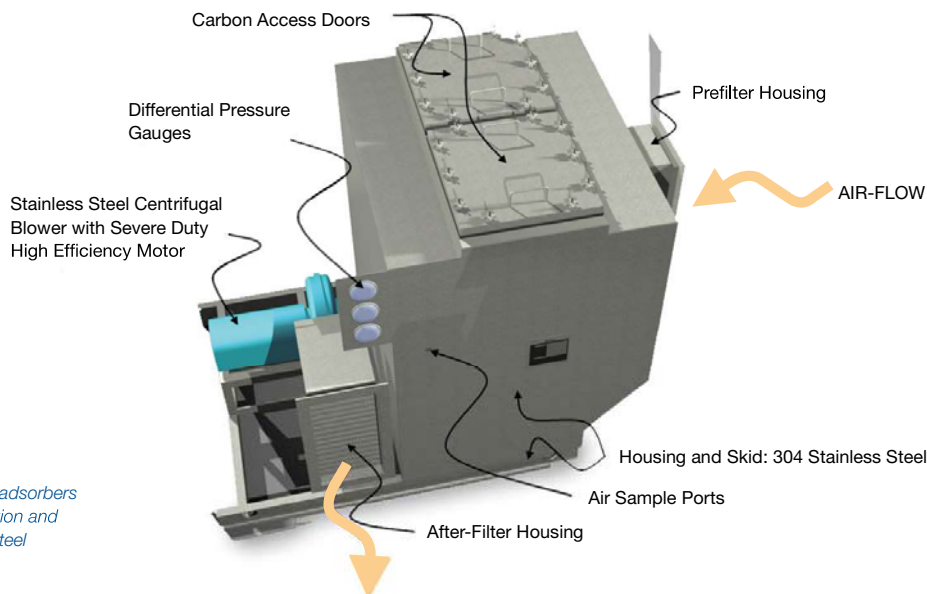
Application – Corrosive Gas Elimination

Designed to purify inlet airstreams for pressurization of rooms in which sensitive electronic and mechanical equipment is located. The most accepted method of attaining a purified air stream is to use a deep



Barnebey Sutcliffe® has extensive installations in a wide variety of industries throughout the U.S. and Canada, including pulp and paper, chemical manufacturing, laboratories and industrial manufacturing facilities.

bed carbon adsorber filled with specially treated activated carbon to remove the corrosive gases. A properly designed adsorber will be able to reduce corrosive gas levels to the point where they are not a factor in equipment failure. With correct carbon selection, all corrosive gases such as hydrogen sulfide, hydrogen chloride, chlorine, etc., are removed at 99.9% efficiency.



Barnebey Sutcliffe® deep bed adsorbers feature pull-through configuration and continuous-welded stainless steel construction.

Application – Hazardous Chemical and VOC Control

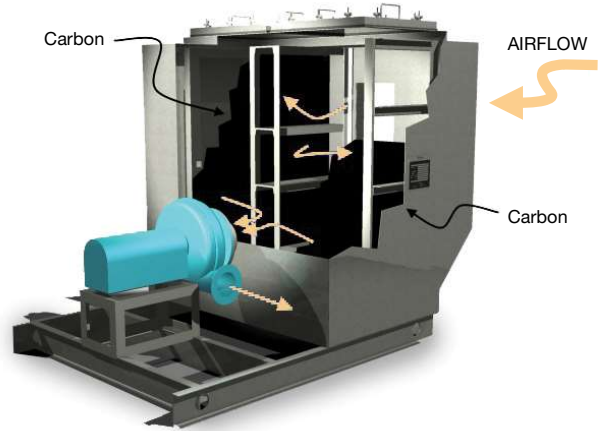
Our deep bed carbon adsorbers are easily modified for a variety of other applications including atmospheric emission control and personnel protection. These durable activated carbon systems are available over a flow range of 100 to 20,000 cfm with flexibility to allow you to adapt to constantly changing regulations from local Air Pollution Control District (APCD), EPA Air Quality Act, OSHA Regulations, EPA NESHAP’s regulations, and ASHRAE’s Indoor Air Quality Standards.

Application – Odor Control

Ninety percent of a person’s life is spent indoors. Studies have shown that in many commercial, industrial, and public buildings levels of nuisance odors and pollutants such as hydrogen sulfide (H₂S) can be two to five times greater indoors than outdoors. Odors and irritants increase business costs through productivity losses, sick days, and medical expenses as well as employee and community concerns and complaints. Deep bed units can remove 99.9% of H₂S as well as other odors with correct activated carbon selection.

Other Applications

With over 500 different carbon products available, Barnebey Sutcliffe® will design a system for you to meet any contaminate concern. We provide the greatest level of technical support from application computer modeling to laboratory performance testing to pilot units for field testing. Many of our deep bed systems and carbon solutions are custom tailored to your exact requirements.



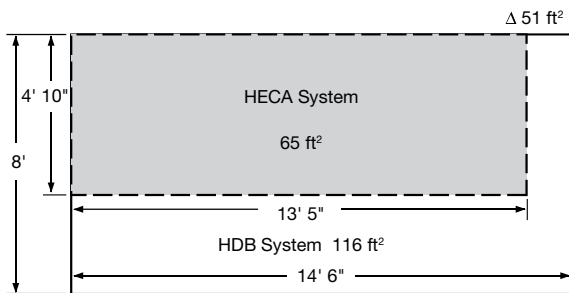
Cutaway showing dual carbon bed design

Assured Performance

The complete deep bed carbon units, including dust filter, carbon section, final filter, and blower, are available in capacities from 100 to 20,000 cfm and may be customized with respect to carbon bed depth, guard beds, dampers, pressure gauges, etc., to meet your requirements.

Deep bed adsorbers operate in one of three modes: outside air only, full recirculation, and recirculation with outside air make-up. They provide greater than 99.9% removal. Provisions to preclude bypass in the unlikely event of bed settling are incorporated in the design. The system utilizes a gasketless, continuously welded housing of a high-quality stainless steel to preclude the bypass of contaminated air around the carbon bed. The fan assembly comes with a severe duty, high-efficiency motor. Motor speeds are kept to a minimum to ensure quiet operation and maximum life.

The deep bed low maintenance, activated carbon adsorber system is also configured to enable you to monitor carbon usage and take the guesswork out of determining the remaining carbon bed life. Sample ports upstream can be used to test for inlet corrosive gas concentrations, while the downstream sample port indicates final outlet concentrations. Three sample ports located evenly throughout the carbon bed indicate the location of the mass transfer zone and remaining amount of unused activated carbon in the system.



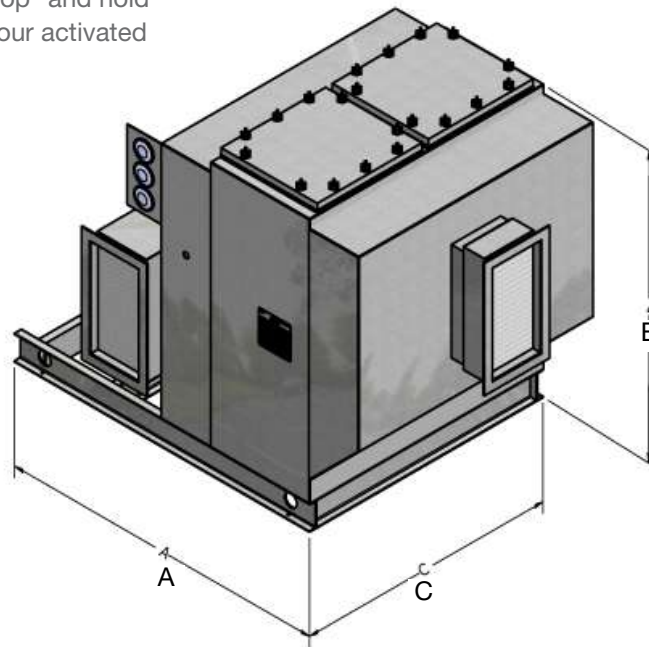
The typical Barnebey Sutcliffe® 4000 cfm HECA™ system requires almost 45% less floor space than a horizontal deep bed (HDB™) system.

Complete Systems and Services

Barnebey Sutcliffe® will engineer your deep bed carbon adsorber as a complete unit operation. Systems can be manufactured to include fans, motors, dampers, isolation and bypass pre- and post-filters, controls, and exhaust stacks so that all you need to do is provide the inlet connection. When in service, we can provide sampling of the carbon bed to test for remaining activated carbon life to assist in developing an activated carbon exchange schedule. Once the carbon is spent and needs to be exchanged, our field service team will remove the spent carbon and install fresh carbon in a single day to minimize downtime to your operation. We will assist you in profiling the spent carbon and arrange that the spent carbon be recycled at one of our plants, removing your liability. Barnebey Sutcliffe® offers these products and services so that you may “one-stop shop” and hold one vendor accountable for your activated carbon system.

Benefits and Special Features:

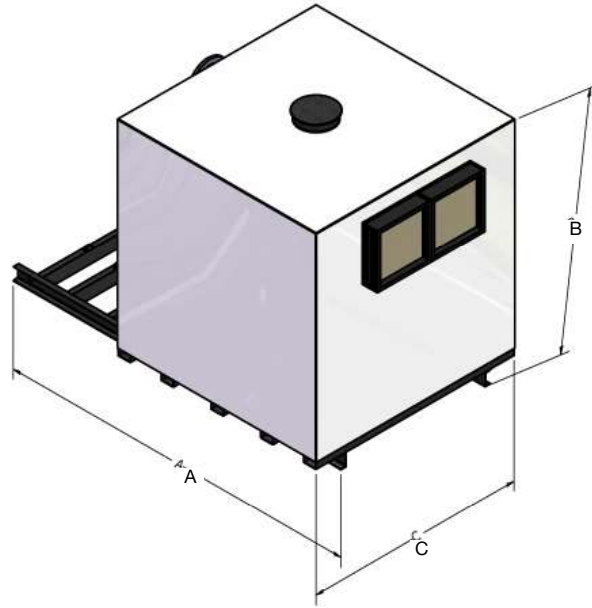
- Greater than 99.9% efficiency of contaminants removed.
- Low static pressure drop.
- Minimal footprint.
- Broad product line with custom sizes, flow rates, and activated carbon selection.
- Sample ports.
- Lower maintenance costs than when using several single units.
- Carbon exchange services.
- Available in carbon steel, aluminum, and stainless steel. Other materials offered as special order.
- Turnkey units available.



Standard HECA™ Dimensions

Flow	Dim A.	Dim B.	Dim C.	Bed Volume	Approx lbs. Empty	Est Pressure Drop
300 CFM	9' - 10"	4' - 9"	2' - 6"	20 cu. ft.	1,500 lbs.	8" - 10"
1,000 CFM	9' - 2"	5' - 8"	3' - 9"	34 cu. ft.	1,800 lbs.	8" - 10"
2,000 CFM	10' - 2"	6' - 0"	4' - 10"	66 cu. ft.	2,100 lbs.	8" - 10"
5,000 CFM	13' - 8"	6' - 0"	4' - 10"	169 cu. ft.	2,500 lbs.	8" - 10"
10,000 CFM	18' - 2"	7' - 9"	6' - 6"	328 cu. ft.	2,900 lbs.	8" - 10"
20,000 CFM	20' - 6"	8' - 11"	9' - 6"	640 cu. ft.	3,400 lbs.	8" - 10"

Custom Sizes Are Available



Standard HDB™ Dimensions

Flow	Dim A.	Dim B.	Dim C.	Bed Volume	Approx lbs. Empty	Est Pressure Drop
300 CFM	4' - 0"	3' - 0"	3' - 5"	8 cu. ft.	300 lbs.	12" - 15"
1,000 CFM	12' - 2"	5' - 10"	2' - 4"	49 cu. ft.	1,000 lbs.	12" - 15"
2,000 CFM	12' - 3"	6' - 2"	6' - 0"	81 cu. ft.	1,800 lbs.	12" - 15"
5,000 CFM	19' - 2"	6' - 10"	8' - 0"	240 cu. ft.	2,500 lbs.	12" - 15"
10,000 CFM	27' - 6"	7' - 2"	8' - 0"	432 cu. ft.	3,200 lbs.	12" - 15"
20,000 CFM	34' - 0"	7' - 2"	10' - 0"	864 cu. ft.	4,200 lbs.	12" - 15"

Custom Sizes Are Available

ATTENTION: Wet-activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable Federal and State requirements.

Limitation of Liability

Notwithstanding any provision to the contrary herein, in no event shall Supplier or its contractors or suppliers of any tier be liable to Purchaser for any indirect, special, consequential, incidental or punitive damages as a result of a breach of any provision hereunder or for any other claim of any kind arising out of or relating to this document, whether in contract, in tort (including without limitation, negligence or strict liability), indemnification or otherwise. Notwithstanding any provision to the contrary herein, for all losses, damages, liabilities or expenses (including attorney's fees and costs), whether for indemnity or negligence, including errors, omissions or other acts, or willful misconduct, or based in contract, warranty (including any costs and fees for repairing, replacing or re-performing services or curing a breach hereof), or for any other cause of action (individually, a "Claim"; collectively, "Claims"), Supplier's liability, including the liability of its insurers, employees, agents, directors, and officers and all other persons for whom Supplier is legally responsible, shall not, to the maximum extent permitted by law, exceed in the cumulative aggregate with respect to all Claims arising out of or related to this document, the total amount of compensation paid to Supplier hereunder. All Claims of whatsoever nature shall be deemed waived unless made in writing within forty-five (45) days of the occurrence giving rise to the Claim.

Warranty Disclaimer

Calgon Carbon Corporation warrants that the HDB/HECA Deep Bed Adsorbers will be free from defects in materials and workmanship for a period of 90 days following the date of purchase. In the event of a breach of this warranty, Calgon Carbon Corporation will, in its discretion, repair or replace any defective parts or the complete unit during the warranty period. This warranty does not apply to defects caused by (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of HDB/HECA Deep Bed Adsorbers in a manner for which it is not designed, (v) external causes such as, but not limited to, power failure or electrical power surges, or (vi) improper storage and handling of the HDB/HECA Deep Bed Adsorbers. EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY STATEMENT, CALGON CARBON CORPORATION DISCLAIMS ALL OTHER WARRANTIES, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CALGON CARBON CORPORATION DOES NOT WARRANT THAT THE HDB/HECA DEEP BED ADSORBERS ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT. ANY ADVICE OR ASSISTANCE FURNISHED BY CALGON CARBON CORPORATION IN RELATION TO THE HDB/HECA DEEP BED ADSORBERS PROVIDED FOR HEREUNDER SHALL NOT GIVE RISE TO ANY WARRANTY OR GUARANTEE OF ANY KIND. THIS WARRANTY WILL TAKE PRECEDENCE OVER ANY AND ALL OTHER WARRANTIES UNLESS SPECIFICALLY DISCLAIMED AND REFERENCED BY CALGON CARBON CORPORATION.

Calgon Carbon Corporation is constantly striving to improve its products and capabilities and to provide the best product to its customers.

Calgon Carbon Corporation may from time to time develop product improvements or alterations (including, without limitation, revisions to product specifications), and may implement such Product Improvements without notice to the Buyer.

