



100 cfm

**PROTECT™ VS Range**

4500 cfm

## **PROTECT™ VS**

### **Description**

The PROTECT™ VS vapor phase carbon adsorber canisters are air-or vapor-treatment units that can treat higher flow rates and contain larger beds of activated carbon, but with the convenience of an economical canister. PROTECT™ VS canisters contain all of the operating elements required for utilization of granular activated carbon in air or vapor treatment, including a flat carbon bed support across the entire bed cross sectional area and plenum area below this support for effective air introduction and distribution across the bed. The canisters are constructed of unlined carbon steel with a stainless steel screen bed support for use with activated carbon in air treatment.

The PROTECT™ VS vapor phase carbon adsorber canisters are available in three sizes that can contain up to 8,000 pounds of granular activated carbon for treating air or vapor sources typically up to 4,500 cfm. The PROTECT™ VS canisters can be used in operating pressures up to 1 psi and a moderate vacuum of up to 5 inches mercury.

The PROTECT™ VS vapor phase adsorbers can be provided with any of Calgon Carbon's wide variety of vapor phase activated carbon products that can be selected for a specific air or vapor treatment application.

### **Features**

The PROTECT™ VS vapor phase carbon adsorber canisters offer several important features that make it an effective value-driven option for many air or vapor phase treatment applications:

- Sturdy carbon steel construction.
- Capable of operating up to 1 psig, which will manage most vent or exhaust fan situations.
- Exterior painted with a durable urethane finish.
- Operating temperature up to 200 degrees F.
- Top 16-inch diameter access port for activated carbon media fill and removal.
- Carbon bed support across the full canister cross sectional area, consisting of 20 mesh type 316 stainless steel screen placed on steel grating for vapor distribution across the entire bed for maximum activated carbon utilization and low pressure drop.



- Top lifting lugs and bottom fork guides for portability.

### **Installation**

PROTECT™ VS canisters are shipped with the dry activated carbon fill installed in the unit. The canisters are self-supporting and should be set on a level accessible area as near as possible to the emission source. Standard installation does not utilize any anchoring devices. Installation is simple, requiring a flexible hose, duct or pipe to connect the vent or emission source to the flanged bottom inlet of the canister.

The PROTECT™ VS canister's treated air discharge is a flanged connection on the upper side of the vessel and can be left open or equipped with flexible hose, duct or pipe to direct the treated air to a desired discharge point. If the canister is located outside and is to be vented directly, then a U-shaped outlet pipe or rain hat (such as a pipe tee) is recommended to be installed to prevent precipitation from entering the unit.

The recommended air flow for the PROTECT™ VS canisters are listed in the table on page 3. If higher flows are anticipated, then either a larger canister should be utilized or two or more PROTECT™ VS canisters should be placed in parallel operation.

The table also lists the recommended maximum static pressure and vacuum capabilities. These ratings should not be exceeded, as the canister could be irreparably damaged.

### Carbon Exchange or Replacement

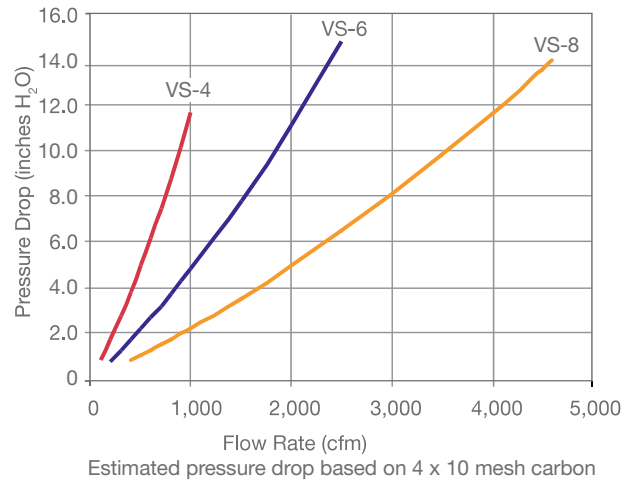
When the treated air or vapor exceeds the desired contaminant concentration, the granular activated carbon in the PROTECT™ VS canister should be replaced with fresh activated carbon. The canister is to be isolated from the process by either closing and locking the inlet and outlet valves, or physically disconnecting the canister from the inlet and outlet pipe or hose. The carbon exchange procedure can either take place where the canister is installed, or the disconnected canister can be moved to another location for this activity.

Contact Calgon Carbon Corporation for resupply of the carbon products and complete turnkey services, including removal and

management of the spent carbon and refilling the canister with the fresh carbon.

### Pressure Drop Curve

Pressure drop through a PROTECT™ VS canister is a function of the process air flow as shown in the graph below. If higher flows or lower pressure drop are needed, multiple canisters can be installed in parallel operation. The maximum pressure in the canister should not exceed 1 psig, regardless of the pressure drop across the unit.

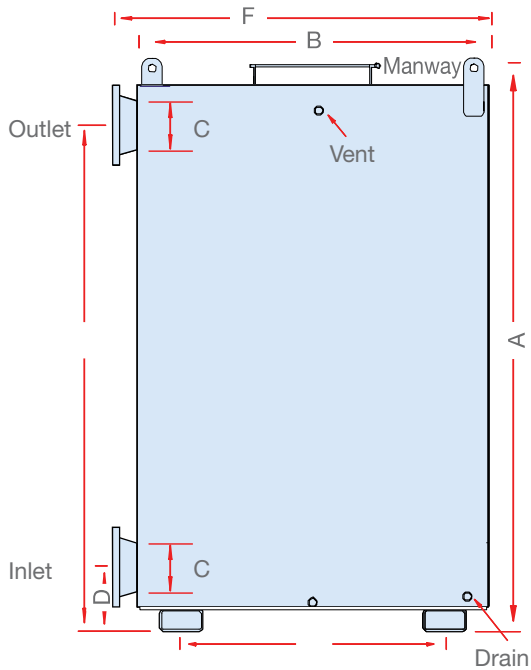


### Specifications

<b>Canister</b>	Sturdy carbon steel canister with 1/4" thick steel shell and 1/4" steel flat bottom and top heads (3/8" thickness for Model VS-8)
<b>Pressure</b>	Recommended 1 psig maximum operating pressure (shop hydrotested in excess of recommended pressure)
<b>Vacuum</b>	Recommended maximum 2" Hg vacuum operation
<b>Temperature</b>	Recommended 200° F (max)
<b>Internal Coating</b>	None – unfinished steel
<b>External Coating</b>	Direct-to-Metal polyurethane
<b>Inlet (bottom side)</b>	6" - 12" RF weld neck 150# flange (refer to chart for sizes for each Model)
<b>Inlet Distributor</b>	Stainless steel screen bed support on galvanized steel grating
<b>Outlet (top head)</b>	6" - 12" RF weld neck 150# flange (refer to chart for sizes for each Model)
<b>Drain (two on bottom)</b>	3/4" FPT coupling with 3/4" threaded plug
<b>Access Port</b>	16" diameter access port with threaded clamp ring and BUNA-N gasket
<b>Dimensions</b>	Refer to Model chart

### Calgon Carbon Air Purification Systems

The PROTECT™ VS canister is designed for a variety of air or vapor applications at air flows up to 4,500 cfm and pressures up to 1 psi. Calgon Carbon Corporation offers a wide range of carbon adsorption systems and services for a range of air or vapor flow rates and pressures to meet specific applications.



### Safety Considerations

While complying with the recommended installation instructions, plant operators should also be aware of these additional heat-related safety considerations:

- When in contact with activated carbon, some types of organic chemical compounds, such as those from the ketone and aldehyde families and some organic acids or organic sulfur compounds, may react on the carbon surface causing severe exotherms or temperature excursions. **If you are unaware or unsure of the reaction of an organic compound on activated carbon, appropriate tests should be performed before placing a PROTECT™ VS canister in service.**
- Heat of adsorption can lead to severe temperature excursions at high concentrations of organic compounds in the inlet air or vapor. Heating may be controlled by diluting the inlet air or adding water vapor as a heat sink, by time weighting the inlet concentration to allow heat to dissipate, or by prewetting the carbon.

### Model Information

Model Number	VS 4	VS 6	VS 8
GAC or media volume (cu ft)	72	180	288
GAC amount (pounds)	2,000	5,000	8,000
Recommended maximum air rate (cfm)	1,100	2,500	4,500
Weight, empty (pounds)	1,760	3,340	4,900
Approximate operating weight (pounds)	3,760	8,340	12,900
Cross sectional area; square feet	16	36	64
Overall height (A) in. (approx)	78	103	103
Width of side (B) in. +/- 1/4"	49	73	97
Inlet/Outlet (C) 150# RF flange	6	8	12
Height to inlet (D) in. (approx)	8	10	13
Height to outlet (E) in. (approx)	70	92.5	89
Length including inlet/outlet flanges (F) +/-	52	77	101
Width of forkguides (G) in.	36	48	48

- STI™-X carbon can liberate heat by reacting chemically with oxygen. To prevent heat buildup within a canister, the carbon must not be confined without adequate air flow to dissipate the heat. In situations where there is insufficient or disrupted air flow through the vessel, the chemical reaction can be prevented by sealing the inlet and outlet connections to the canister.

### Safety Message

Activated carbon will preferentially remove oxygen from air. In closed or partially closed containers or vessels, oxygen depletion may reach hazardous levels. If workers are to enter a container or vessel containing activated carbon, appropriate air sampling and work procedures for potentially low-oxygen-content 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 PROTECT™ VS 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 PROTECT™ VS 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 PROTECT™ VS. 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 PROTECT™ VS ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT. ANY ADVICE OR ASSISTANCE FURNISHED BY CALGON CARBON CORPORATION IN RELATION TO THE PROTECT™ VS 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.

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