

PROTECT VW

Carbon Adsorber Canisters



Description

The PROTECT VW vapor phase carbon adsorber canisters are economical air or vapor treatment units for short term usage applications. PROTECT VW 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 and carbon steel bed support for use with activated carbon in air treatment.

The PROTECT VW vapor phase carbon adsorber canisters are available in 2 convenient sizes that will contain 1000 or 1800 pounds of granular activated carbon for treating air or vapor sources typically up to 1,000 cfm.

The PROTECT VW vapor phase adsorbers can be provided with any of Calgon Carbon Corporation's wide variety of vapor phase activated carbon products that can be selected for a specific air or vapor treatment application. Most commonly used are Type AP4-60 grade virgin activated carbon, which is a 4mm pelletized activated carbon with a carbon Tetrachloride Number of 60 for higher purity air or vapor, or optimal usage for low levels of organic contamination, or Type VPR quality controlled reactivated grade vapor phase carbon for a more economical carbon product for general air treatment.

Features / Benefits

The PROTECT VW 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 3 psig which will manage most vent or exhaust fan situations.
- Exterior painted with a durable urethane finish
- Operating temperature up to 200°F
- Top 16 inch diameter access port for activated carbon media fill and removal and low pressure drop.
- Carbon bed support across the full canister cross sectional area, consisting of 20 mesh type 316 stainless steel screen placed on slotted steel plate 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

Specifications PROTECT VW

Canister	Sturdy 10 gauge carbon steel canister with 3/16" thick steel flat bottom and top heads
Pressure	Recommended 3 psig maximum operating pressure (shop hydrotested in excess of recommended pressure)
Vacuum	Not rated for vacuum (not recommended to be operated under vacuum conditions)
Temperature	Recommended 200°F (max)
Internal Coating	None – unfinished steel
External Coating	Direct - to - Metal polyurethane
Inlet (bottom side)	4" FPT coupling (shipped with plug)
Inlet Distributor	Stainless steel screen bed support on slotted steel plate
Vent / Sample Port	3/4" FPT coupling
Outlet (top head)	4" FPT coupling (shipped with plug)
Drain	3/4" FPT coupling with 3/4" threaded plug
Access Port	16" diameter access port with threaded clamp ring and BUNA-N gasket.
Dimensions	Refer to Model Chart

Safety Message

Wet activated carbon can deplete oxygen from air in enclosed spaces. If use in an enclosed space is required, procedures for work in an oxygen deficient environment should be followed.

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Installation

PROTECT VW canisters are shipped ready for installation 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, properly supported duct or pipe to connect the vent or emission source to the 4 inch FPT bottom inlet of the canister.

The PROTECT VW canister's treated air discharge is a 4 inch FPT connection on the top of the vessel and can be left open or equipped with flexible hose, properly supported duct or pipe to direct the treated air to a desired discharge point. If the canister is located outside and 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 VW canisters are listed in the table. If higher flows are anticipated, then either a larger canister should be utilized or two or more PROTECT VW canisters should be placed in parallel operation.

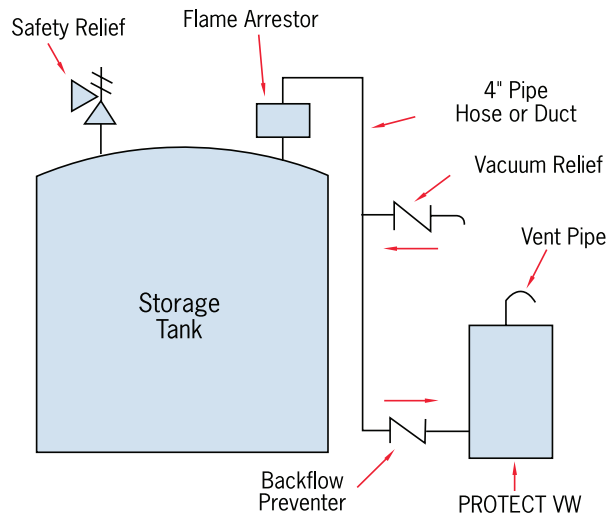
The recommended maximum static pressure and vacuum capabilities are also listed. These ratings should not be exceeded, as the canister could be irreparably damaged.

PROTECT VW canisters can be used to treat vents directly from storage tank or other process vessels. The motive force for the air or vapor can be produced by either a blower or by using the positive pressure inside the tank or process vessel. In many cases, the pressure or surge of pressure within the tank or vessel is sufficient to overcome the pressure drop across the canister, eliminating the need for a blower. Please consult the pressure drop data in this bulletin for more information.

When PROTECT VW canisters are used to control vapors from organic solvent storage tanks, refer to the typical installation drawing in the bulletin and the following recommended precautions:

- A safety relief valve must be provided on the storage tank. This protects the storage tank should the canister become plugged or blocked in any fashion. Such a vent would open in an emergency situation, thereby relieving pressure within the storage tank.
- Under appropriate conditions, a flame arrestor and/or backflow preventer must be installed as shown in the typical installation drawing. This prevents backflow of air through the canister when the storage tank is being emptied.
- High organic compound concentration in the vented air or vapor—defined as being greater than 0.5 to 1.0 volume %—may cause an elevated heat of adsorption in the carbon bed. This effect can be dissipated by pre-wetting the carbon to provide a heat sink, adding dilution air to the vented air or vapor to reduce the concentration, or by adding water spray to the vented air or vapor to provide an ongoing heat sink.

Typical Protect VW Installation at Storage Tank



If PROTECT VW canisters are used to control organic compound emissions from air-strippers, soil venting or other high moisture content air or vapor streams, then it is recommended that the humidity in the air stream be reduced to under 50%. High humidity may cause water vapor to condense within the carbon pores, filling the pores with water and preventing the air or vapor with organic contamination from accessing the internal surface of the activated carbon where adsorption takes place. Therefore, lower humidity will optimize the adsorptive capacity of the activated carbon. Also, for applications that may carry condensed water, it is recommended to install a drain or condensate trap on the inlet duct or piping.

Carbon Exchange or Replacement

When the treated air or vapor exceeds the desired contaminant concentration, the granular activated carbon in the PROTECT VW 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.

The spent granular activated carbon can be removed by using a vacuum media removal procedure through the top access port. Fresh granular activated carbon can be filled using bags or "supersacks" by loading into the canister through the top access port. Refer to the table for the recommended amount of carbon to be used. Once the fresh carbon is installed and the bed leveled, the access port securely closed, and the inlet and outlet connections are reestablished, follow the procedures under the Installation section.

Contact Calgon Carbon Corporation for resupply of the carbon products for effective air or vapor treatment. Calgon Carbon Corporation can also provide complete turnkey services, including removal and management of the spent carbon and refilling the canister with the fresh carbon.

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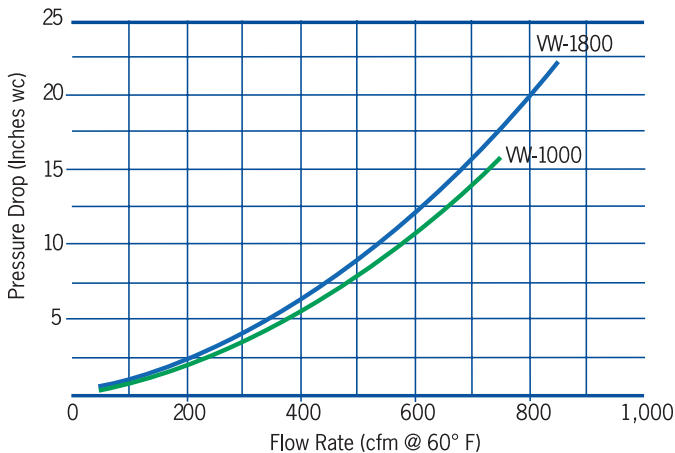
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Pressure Drop

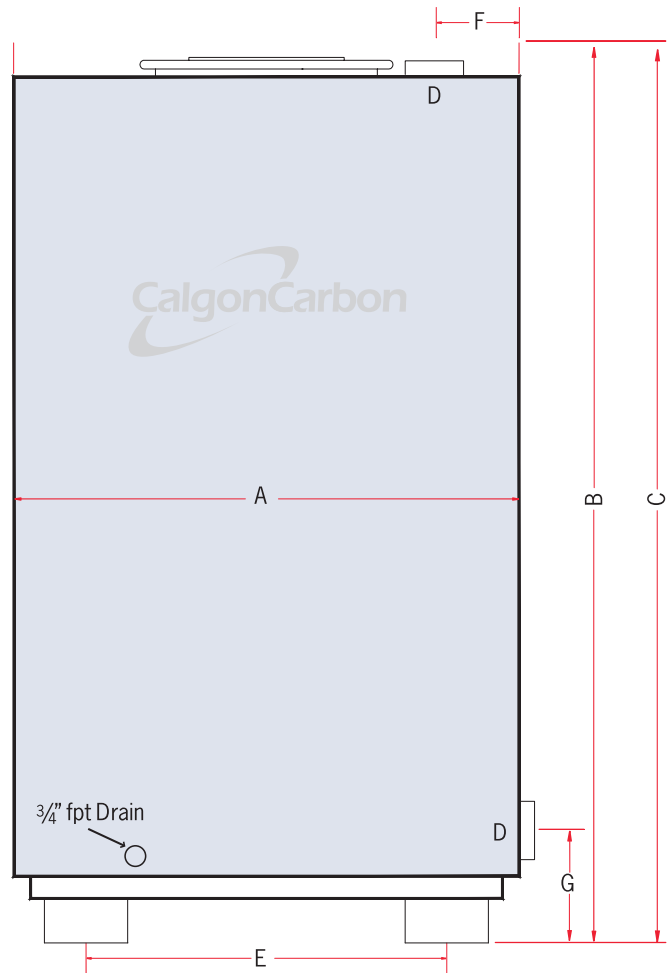
The approximate pressure drop through a PROTECT VW canister is a function of the process air flow as shown in the graph. If higher flows or lower pressure drop is needed, multiple canisters can be installed in parallel operation. The maximum pressure in the canister should not exceed 3 psig, regardless of the pressure drop across the unit.

Pressure Drop Curve



Calgon Carbon Air Purification Systems

The PROTECT VW canister is designed for a variety of air or vapor applications at low to moderate air flows. Calgon Carbon Corporation offers a wide range of carbon adsorption systems and services for a range of air or vapor flow rates and carbon usages to meet specific applications.



Model Number VW 1000 VW 1800

	VW 1000	VW 1800
GAC or media volume	33 (cu ft)	60 (cu ft)
GAC amount	1000 lbs	1800 lbs
Recommended maximum air rate	750 (cfm)	850 (cfm)
Weight, empty	670 lbs	730 lbs
Approximate operating weight	1,670 lbs	2,530 lbs
Diameter (A)	45.5 in	48 in
Height to top outlet (B) in.	52.5 in	76.5 in
Overall height (C) to top of lifting lugs	54.375 in	78.375 in
Inlet / Outlet (D) fpt	4 in	4 in
Forklift Guides (E)	36 in	38 in
Outlet to side wall (F)	7 in	7.75 in
Height to Inlet (G)	6.375 in	6.375 in

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Safety Considerations

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

- 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 VW 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 pre-wetting the carbon.
- **Do not use PROTECT VW canisters with ST1-X carbon in petrochemical or chemical industry applications.**
- ST1-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.
- For temperatures greater than 140°F, Calgon Carbon recommends that personnel protection be provided. The form of protection is determined per the end users specific plant practices and standards. Also note that at elevated temperatures, the paint may discolor.

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