

# PROTECT TW

## Carbon Adsorber Canisters



### Description

The PROTECT TW carbon adsorber canisters are economical water treatment units for short term usage applications. PROTECT TW canisters contain all of the operating elements required for utilization of granular activated carbon in water treatment, including a corrosion resistant underdrain for effective treated water collection. The PROTECT TW canisters are constructed of carbon steel with a corrosion resistant inner coating for use with granular activated carbon in water treatment.

The PROTECT TW carbon adsorber canisters are available in 3 convenient sizes that will contain 500, 1000, and 2000 pounds of granular activated carbon for treating water sources up to 90 gpm.

The PROTECT TW canisters can be provided with any of Calgon Carbon's wide variety of liquid phase granular activated carbon products that can be specifically selected for a specific water or liquid treatment application. Most commonly used are Filtrasorb grade virgin activated carbon for higher purity water or optimal carbon usage for low levels of organic contamination, or DSR series quality controlled reactivated grade carbon for a more economical carbon product or wastewater treatment.

### Features

The PROTECT carbon adsorber canisters offer several important features that make it an effective value driven option for many water treatment applications:

- Sturdy carbon steel construction
- Capable of operating up to 75 psig as canisters are shop hydrotested at higher pressures after fabrication.
- Interior is coated with a corrosion resistant high solids epoxy coating
- Exterior painted with a durable urethane finish
- Operating temperature up to 140 degrees F
- Top 12X16 access port for activated carbon media fill and removal
- Lower PVC laterals with carbon retention slots for even water collection and maximum activated carbon utilization.
- Top inlet flow deflector to allow introduction of influent water above the carbon bed
- Top lifting lugs and bottom forklift guides for portability



### Specifications

Canister	Sturdy carbon steel canister with flat bottom and dished top head
Pressure	Recommended 75 psig maximum operating pressure; shop hydrotested in excess of recommended pressure
Temperature	Recommended 140°F (max)
Internal Coating	High solids epoxy
External Coating	Direct-to-Metal polyurethane
Inlet	2" FPT coupling (all sizes) shipped with plug
Inlet Distributor	PVC inlet flow deflector
Vent	3/4" FPT coupling with 3/4" brass ball valve
Outlet	2" FPT coupling (all sizes) shipped with plug
Outlet Collector	PVC pipe with slotted laterals
Drain	3/4" FPT coupling with 3/4" threaded plug
Access Port	12"x16" access port with EPDM gasket
Dimensions	Refer to Model Chart

# PROTECT TW

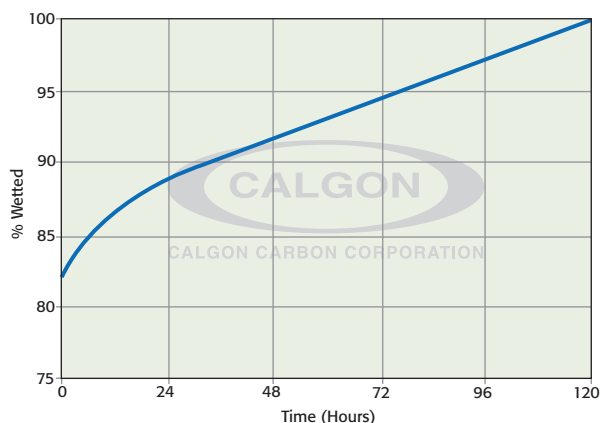
## Carbon Adsorber Canisters

### Installation

PROTECT TW canisters are shipped with dry activated carbon installed in the vessel; the carbon must be wetted and de-aerated prior to use. This procedure displaces air from the internal structure of the carbon granule, thus assuring that the liquid to be treated is in contact with the carbon surface.

Prior to operation, each canister must be filled with clean water; the water should be introduced into the bottom effluent connection. The canister should sit for approximately 48 hours to allow most of the carbon's internal surface to become wetted as shown on the wetting curve.

### Wetting Curve for GAC (77°F/25°C)



After wetting, the carbon bed can be de-aerated by draining the canister from the effluent line and then refilling the canister upflow with clean water. This procedure will eliminate any air pockets which may have formed between the carbon granules. The PROTECT TW canister is now ready for operation.

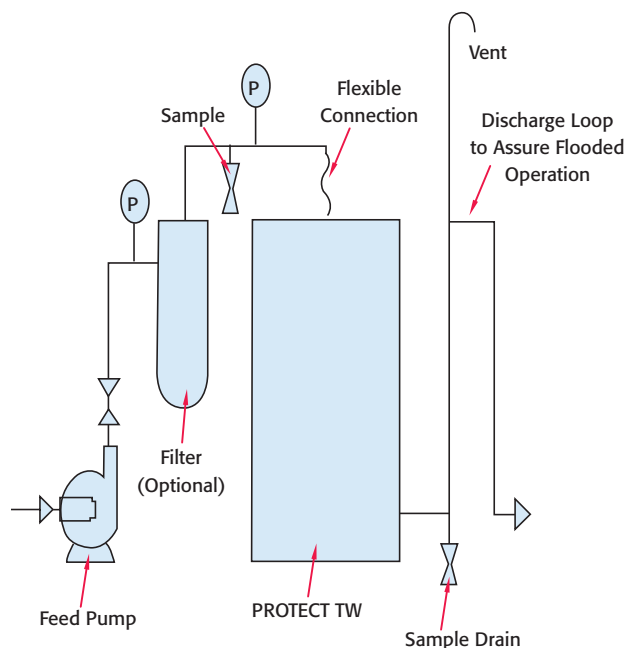
The PROTECT TW canister should be set on a flat level surface and piped as recommended in the installation illustration. The influent pipe should be attached to the unit by using a flexible connection to allow minor deflection in the piping to vessel connection or the vessel top head.

The PROTECT TW canister discharge piping should include an elevated piping loop to ensure that the canister remains flooded with water at all times. In addition to the piping loop, a drain connection is recommended on the discharge piping to allow for drainage of the canister prior to disconnection or during a temporary shutdown.

A filter should be installed prior to the canister if the liquid to be treated contains substantial amounts of suspended solids. A simple cartridge of screen filter helps prevent pressure buildup in the carbon bed.

A pressure relief device should be installed in a line open to the canister if the system can potentially be subject to pressures beyond the design point. Consult plant and/or local OSHA codes for guidance.

### Typical Installation



### Operation

PROTECT TW canisters should be full of clean water before treatment begins. Flow rate to the unit should be determined based on required contact time between the liquid and the carbon media. In groundwater treatment applications, the recommended contact time, calculated on an "empty bed basis", is typically 8-10 minutes. Consult your Calgon Carbon Corporation Technical sales Representative for advice about proper contact time for you application.

PROTECT TW canisters can be manifolded in parallel operation for higher flow rates. For series operation, two PROTECT TW canisters can be piped together sequentially, as normal pressure drop will not exceed the recommended operating pressure.

The PROTECT TW canisters have adequate space for bed expansion and can be backflushed by introducing clean water or process liquid at approximately 8-10 gpm/sf to the effluent connection and taking backflush water from either the influent connection, and directing this water to a drain suitable for receiving contaminated water with suspended solids and carbon particles.

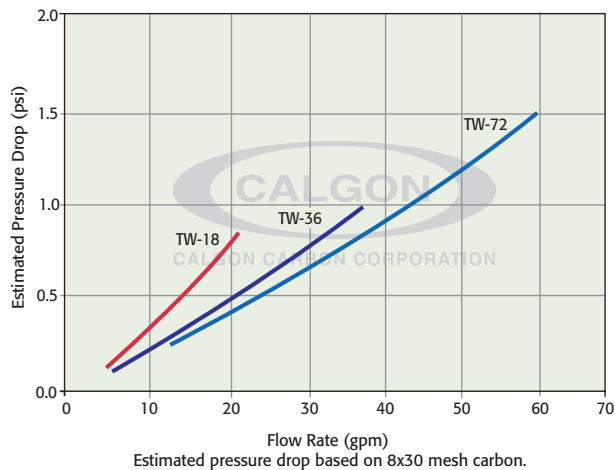
### Pressure Drop

Pressure drop through a PROTECT TW canister is a function of the water or process liquid flow as shown in the graph. If higher flows or lower pressure drop is needed, multiple units can be installed in parallel operation. The maximum pressure in the canister should not exceed 75 psig, regardless of the pressure drop across the unit.



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### Pressure Drop Curve



### Carbon Exchange or Replacement

When the treated water exceeds the desired contaminant concentration, the granular activated carbon in the PROTECT TW canister should be replaced with fresh activated carbon. The PROTECT TW 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.

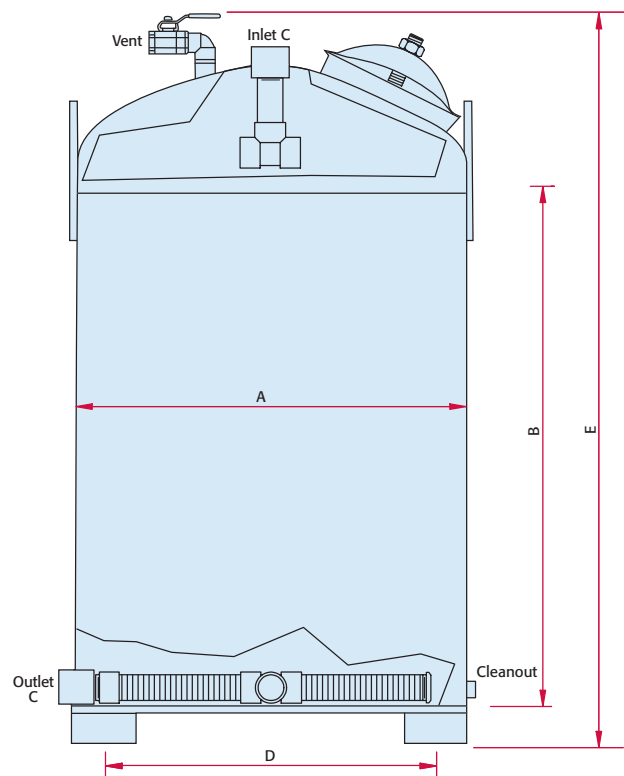
The spent granular activated carbon can be removed by using a vacuum media removal procedure through the top access port. All of the spent carbon must be completely removed from the canister prior to refilling the unit with fresh carbon to assure effluent water quality after the unit is started back up again.

Fresh granular activated carbon can be filled using bags or "supersacks" by loading into the canister through the top access port. In order to prevent damage to the PVC underdrain system, a "water cushion" is to be added to the canister such that the water covers the underdrain system by approximately 1-2 feet. Once the fresh carbon is installed, the access port securely closed, and the inlet and outlet connections are reestablished, follow the startup procedures under the Installation section to wet the carbon.

Contact Calgon Carbon for resupply of the carbon products for effective water treatment. Calgon Carbon can also provide complete turnkey services, including removal and management of the spent carbon and refilling the unit with the fresh carbon.

### Calgon Carbon Water Treatment Systems

The PROTECT TW canisters are designed for a variety of higher pressure water or process liquid applications at low to moderate flowrates. Calgon Carbon Corporation offers a wide range of carbon adsorption systems and services for a range of water or liquid flow rates and carbon usages to meet specific applications.



### Model Information

Model Number	TW 18	TW 36	TW 72
GAC or media volume (cu ft)	18	36	72
GAC amount (pounds)	500	1,000	2,000
Recommended max flow rate (gpm)	20	40	80
Weight, empty (pounds)	500	750	1,050
Approximate operating weight (pounds)	2,000	3,500	4,800
Diameter (A) in.	30	42	48
Can length (B) in.	48	48	72
Inlet /Outlet ( C ) fpt	2	2	2
Forkguides (D) in.	25	37	43
Overall Height (E) in. (approx)	60	67	91
Overall width; in. (approx)	32	44	50

# PROTECT TW

## Carbon Adsorber Canisters



### Warranty

Calgon Carbon Corporation warrants that the PROTECT TW canister 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 the PROTECT TW canister 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 TW canister. **Except as expressly provided in this warranty statement, Calgon Carbon Corporation disclaims all other warranties, whether express or implied, oral or written, including without limitations all implied warranties or merchantability or fitness for particular purpose. Calgon Carbon Corporation does not warrant that the PROTECT TW canisters are error-free or will accomplish any particular result. Any advice or assistance furnished by Calgon Carbon Corporation in relation to the PROTECT TW canister 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.**

### Limitations of Liability

Calgon Carbon Corporation's liability and the Buyer's exclusive remedy for any cause of action arising out of this transaction, including, but not limited to, breach of warranty, negligence and/or indemnification, is expressly limited to a maximum of the purchase price of the canister sold 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. Under no circumstance shall Calgon Carbon Corporation be liable for any incidental, consequential, punitive, exemplary, or special damages of any kind arising as a result of or in connection with the PROTECT TW canisters regardless of the cause giving rise to any claim. Nor shall Calgon Carbon Corporation be liable for loss of profits or fines imposed by governmental agencies. In no event shall Calgon Carbon Corporation's liability exceed the purchase price paid by purchaser, for any reason, whether by reason of breach of contract, tort, indemnification, warranty or otherwise. This limitation of liability statement will take precedence over any and all other liability provisions unless specifically disclaimed and referenced by Calgon Carbon Corporation.

### 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.



Making Water and Air Safer and Cleaner

CALGON CARBON CORPORATION

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### Your local representative