

**Operations, Maintenance and Monitoring Plan
Manual
Air Clear System Carbon Adsorber**

FOR

**Blacklidge Emulsions
2701 E. 2nd Ave. Tampa, FL**

SYSTEM DESCRIPTION

The activated carbon adsorber selected for the Blacklidge Emulsions Air Clear fiber bed coalescing system consist of a seven foot tall four foot diameter steel canister containing 1600 pounds of activated carbon. It is attached to the exit exhaust of the coalescing unit to ensure final reduction of odor causing hydrocarbon or organic vapors. It is used to reduce or eliminate asphalt and/or sulfur based odors to non detect levels. Odor detection from the carbon adsorber should be monitored regularly. When odor breakthrough is detected, it indicates that the carbon is spent and requires changeout, followed by refilling of the adsorber with new or reprocessed carbon.

ADSORBER DESIGN PARAMETERS

The activated carbon adsorber selected for the Blacklidge Emulsions Air Clear fiber bed coalescing system was selected as suggested by the Air-Clear equipment vendor. Airflow is selected in the range of 1500 to 4000 cfm with very low pressure drop. Inlet and outlet diameters should be in the range of 12 inches. Design pressure is 3 psi. Vapor phase activated carbon is selected at 1600 lbs. Large/minimum amounts of carbon in a vessel allow for time-weight adsorbtion capacity. Greater amounts of carbon allow more time between contaminant loading of carbon, allowing time between change out. Currently the amount of carbon (1600lbs) is sufficient for at least 6 months use until a change is needed. Odor detection from the carbon adsorber can be a sufficient method to determine when breakthrough has occurred, with the need to replace. Odor should be monitored regularly.

OPERATION MAINTENANCE and MONITORING

The activated carbon adsorber selected for use at Blacklidge Emulsions requires little operation maintenance as there are no moving parts. Upon first use and installation the unit should be monitored frequently for the first eight hours to note any unusual temperature rise. Activated carbon will usually increase in temperature when first put on-line, however it should stabilize and not rise to temperatures hot to the touch by hand at the vessel exterior. Operating temperatures should be normal at all times and maintenance personal should be aware and note any temperature changes while the unit is operating.

Maintenance personnel should also note any other unusual conditions such as odors or visible emissions coming from the carbon exhaust. Unusual conditions such as elevated temperature, odors, or visible emissions should be reported to management at once, and logged and reported to the file as soon as possible. For system performance and monitoring the facility will use an air sample grab bag to collect for volatile aromatics (e.g. benzene, xylene) and petroleum hydrocarbons. Samples are collected every two months and the analysis is EPA Method 18.

Using a combination of the review of sample analysis and odor monitoring and operating experience over several years it is determined that the carbon adsorber unit should be changed out every 6 months. A six month schedule is practical, economical and within a safe range of collection efficiency prior to odor breakthrough. Records are to be kept with this O, M, & M plan for carbon adsorber system replacement dates, such as purchase request or invoice copies of change out. Laboratory certificate of analysis are to be kept with this O, M, & M Plan.

INSTALLATION

When the carbon adsorber is initially connected upon startup and vapors first contact the activated carbon, the bed temperature may increase due to water vapor and/or contaminant chemical heat of adsorption. Certain chemical compounds in the presence of activated carbon may oxidize, decompose or polymerize. This could result in temperature increases sufficient to cause ignition of the activated carbon or adsorbed material. Upon startup of the adsorber maintain a continuous air flow through the adsorber for the first 24 hours and monitor the effluent gas temperature. A rise in the gas temperature of greater than 50 F is an indication of excessive heat generation. Under these conditions, the unit should be removed from service and the cause of the excessive heat generation should be determined. If an abnormal increase in temperature occurs, disconnect carbon from system influent and cool unit with running water. Isolate unit from nearby flammable equipment and determine if fire control action or help is needed. If a compound's reaction with activated carbon is unknown, appropriate tests should be considered. **See Installation Instructions for the carbtrol G-7 vapor phase adsorber attached at the end of this manual.**

SAFETY

Certain chemical compounds in the presence of activated carbon may oxidize, decompose or polymerize. This could result in temperature increases sufficient to cause ignition of the activated carbon or adsorbed material. If an increase in temperature occurs, disconnect carbon from system in fluent and cool unit with running water. Isolate unit from nearby flammable equipment and determine if fire control action or help is needed. If a compounds reaction with activated carbon is unknown, appropriate tests should be considered.

THIS MANUAL IN ALL

This manual is to be read in entirety by all maintenance personal involved in the operation of the Air Clear vapor mist collection, coalescing system and/or carbon adsorber polishing. Read and thoroughly understand this Manual before attempting to install, operate, or repair any system. Also find the AIR-Clear Operations and Maintenance Manual for Blacklidge and review and understand it completely.

This manual contains important information regarding the installation, set-up and operation of the system. Failure to read and thoroughly understand the information in this manual may result in improper and dangerous installation and operation of the equipment.

If there are any questions regarding this manual or the installation of operation of the system, please contact the carbon vendor, or facility supervisor for clarification before proceeding.

Attachments : Carbtrol Start-up, Installation, and Operating Instruction, Specifications-4 pgs.
Vapor Phase Granular Carbon Info-1 page

READ THESE INSTRUCTIONS THOROUGHLY BEFORE STARTUP.
IMPROPER STARTUP COULD RESULT IN AN UNSAFE CONDITION.

INSTALLATION AND OPERATING INSTRUCTIONS
G-7 VAPOR PHASE CARBTROL® ADSORBER

ADSORBER PREPARATION

When vapors contact activated carbon, the bed temperature may increase due to water vapor and contaminant chemical heat of adsorption.

Where organic contaminant concentrations above 500 ppmv are expected, contact Carbtrol Corp. for evaluation of the potential for heat buildup.

When the Carbtrol adsorber is initially installed, maintain a continuous air flow through the adsorber for the first 24 hours of operation, and monitor the effluent gas temperature. A rise in the gas temperature of greater than 50°F is an indication of excessive heat generation. Under these conditions, the unit should be removed from service and the cause of the excessive heat generation should be determined.

Where the reaction of the contaminated gas stream with activated carbon is unknown, it is advisable to thoroughly wet the carbon with water prior to startup. The following procedure is recommended for wetting the carbon bed:

Remove the shipping plugs from the inlet and outlet ports. Insert a hose into the outlet port and fill the adsorber with water. The filled adsorber must be allowed to stand for at least one hour.

Remove the water before the adsorber is put into service using the 3/4" bottom drain coupling. Replace the 3/4" drain plug before putting the adsorber into operation.

INSTALLATION

To put the Carbtrol G-7 Adsorber into service, place the adsorber on a well drained, level grade or concrete pad in an accessible area, preferably close to the exhaust vent to be treated. Connect a full size pipe or hose from the process exhaust to the inlet port. Where required, a full sized vent line can be connected to the adsorber outlet port to direct treated gases from the immediate area.

Before operating the G-7 Adsorber, a minimum size 8 AWG copper grounding cable should be connected between the cable clamp provided on the support foot of the adsorber, and the building electrical grounding system. If a grounding system is not available, this grounding cable should be connected to a suitably driven ground rod. (See N.E.C. Section 250.83).

Carbtrol adsorbers are not to be used for explosive gas applications. Where upset conditions may cause exceedence of the LEL (lower explosive limit), flame arresters and/or nitrogen blanketing of the process should be considered.

OPERATION

As the contaminated process exhaust gas passes through the adsorber, the granular activated carbon adsorbs the impurities while the purified process gas is discharged from the adsorber. After continued use, the carbon will become saturated with impurities and will require replacement.

Gas discharging from the G-7 Adsorber should be tested regularly to determine when the carbon bed is nearing saturation. Properly scheduled testing of the discharge gas will indicate when breakthrough has occurred and the adsorber should be changed.

The capacity of the activated carbon varies with the type and concentration of impurities in the gases handled. Therefore, the determination of effective adsorber life for a specific use will come with the practical experience of using it under a specific set of operating conditions.

The G-7 Adsorber is designed for permanent installation. Once the carbon is spent, it should be removed by vacuuming, and shipped off site for reactivation or disposal. A vacuum system can be provided for this purpose. Consult Carbtrol.

It is recommended that replacement carbon be kept on site, so that when breakthrough of the carbon occurs, it can be quickly replaced.

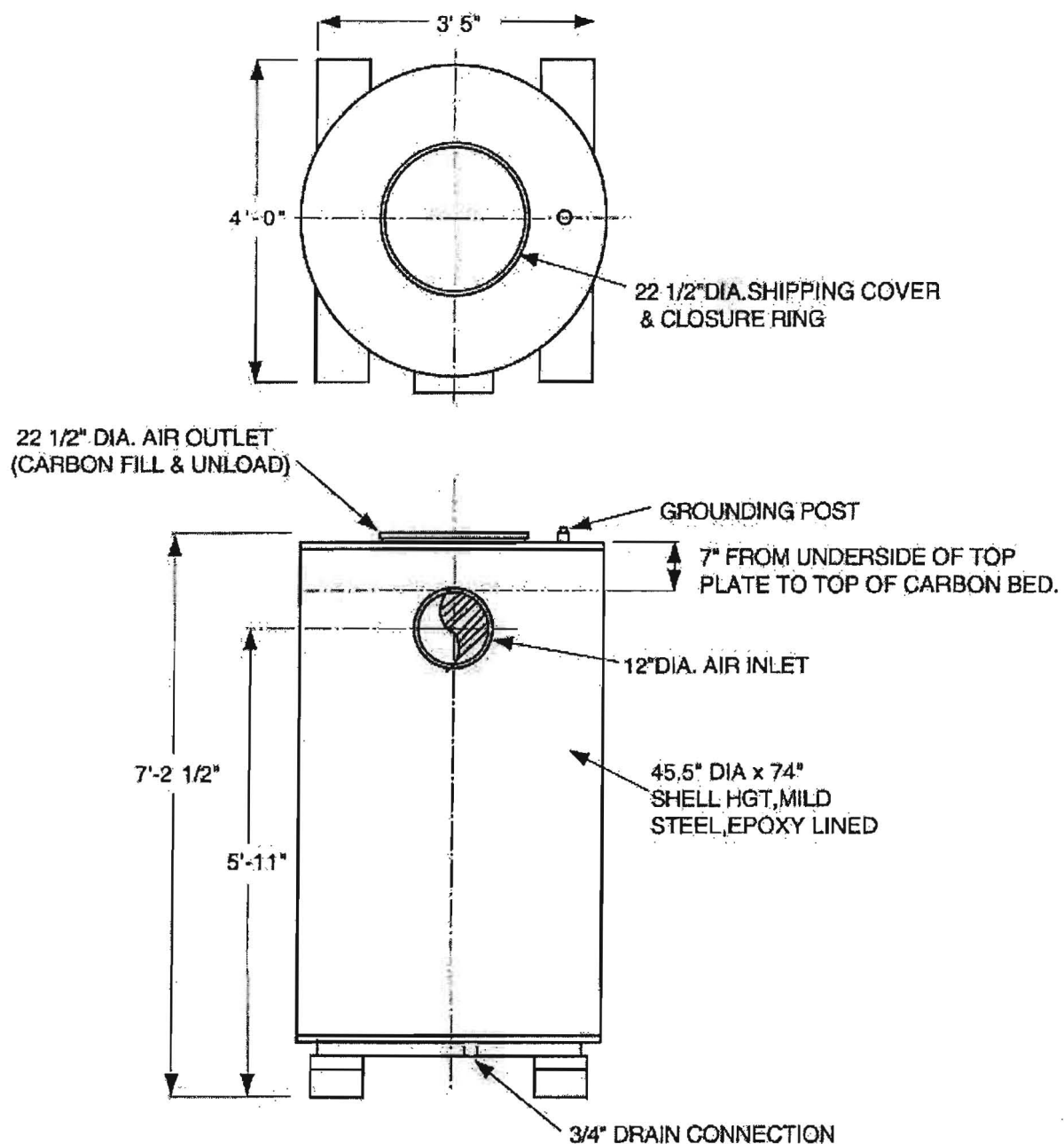
Operating pressure for CARBTROL G-7 Adsorbers should not exceed 9 psig.

WARNING:

- A. Activated carbon can react adversely with some contaminants, which can cause excessive heat buildup. If the effect of the contaminant you wish to treat on activated carbon is unknown, then it must first be tested.
- B. The initial heat of adsorption that occurs when vapors first contact activated carbon causes a rise of temperature in the carbon bed. As recommended above, maintained air flow or wetting of the carbon bed will minimize the initial heat buildup.
- C. Carbtrol adsorbers should not be used with flammable vapors or flammable gas mixtures.
- D. Activated carbon depletes oxygen in enclosed spaces. Follow NIOSH guidelines for safety in enclosed spaces.

WARRANTY

This product is designed to remove toxic pollutants from air. However, there is no assurance of its capacity. SELLER WARRANTS THAT THE GOODS ARE AS DESCRIBED. BUT NO OTHER WARRANTY IS GIVEN, WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Seller will not be liable for loss or damage to property or any incidental or consequential loss or expense from property damage due directly or indirectly from the use of the product.



DRY CARBON SHIPPING WGT=2200#

CARBTROL ®
CORPORATION

51 RIVERSIDE AVENUE
WESTPORT CONN. 06880
(203) 228-5642

SCALE 1/2"=1'0"

DATE 1-8-92

Wah

BY WH

REV 4-23-98

CARBTROL G-7 ADSORBER

1600# CARBON

ARRANGEMENT

S

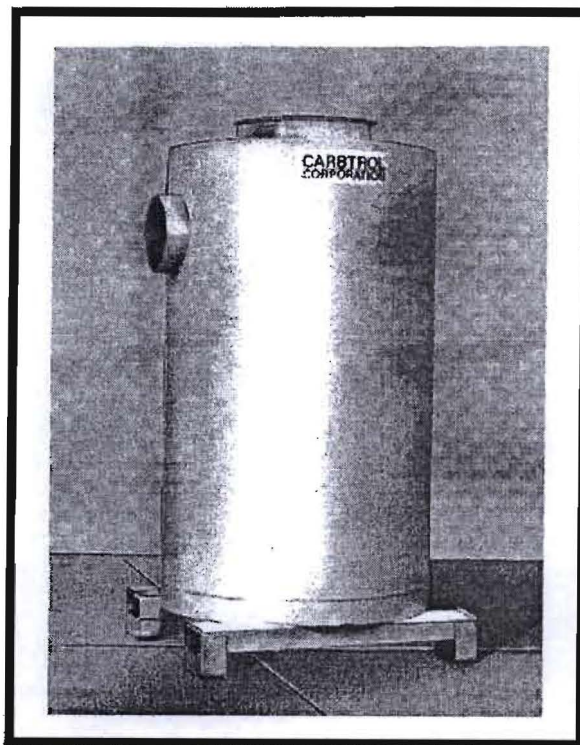
DWG 1596/9

CARBOTROL®

AIR PURIFICATION ADSORBERS

1,600 LB. ACTIVATED CARBON **G-7**

2,600 LB. ACTIVATED CARBON ~~G-8~~



FEATURES

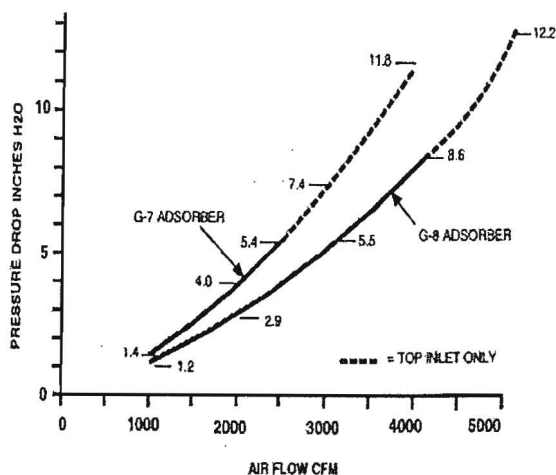
- High air flow capacity.
- Low pressure drop.
- Epoxy lined carbon steel construction with PVC internal piping.
- Radial flow distribution system.
- Bi-directional flow path.
- Fork lift fittings for easy handling.
- High activity carbon.
- Acceptable for transport of hazardous spent carbon.

OPTIONS

- PVC lining or stainless steel construction.
- Interconnecting piping.
- "Take-Back" and Reactivation Services.

SPECIFICATIONS

	<u>G-7</u>	<u>G-8</u>
MAX. FLOW CFM:	4,000	5,000
CARBON (lbs.):	1,600	2,600
DIMENSIONS:	46" Ø x 87" H	60" Ø x 87" H
SHIPPING WT (lbs.):	2,200 Dry	3,300 Dry
INLET:	12" Pipe	16" Duct
OUTLET:	22 1/2" Drum Type Opening	
DESIGN PRESSURE:	3 psi	3 psi



© Copyright 1991 Carbtrol Corporation -7/27/99

AT-415/#2

CARBOTROL®
CORPORATION

51 Riverside Avenue
Westport, CT 06880

1-800-242-1150 • Fax # (203) 226-5322
Web Address: <http://www.carbtrol.com>

Reactivated Granular Carbon (Vapor Phase)

Carbonair's reactivated granular carbon is manufactured from spent bituminous coal and coconut based carbon which has been thermally reactivated to regain its adsorptive capacity. This adsorbent media offers an economical option for treating low level organic hydrocarbons.

Typical Applications

Soil vapor extraction, air stripper off-gas, VOC control, and tank venting.

Typical Contaminants

Petroleum hydrocarbons such as MTBE, BTEX (benzene, toluene, ethylbenzene, xylenes), butylbenzene, isopropylbenzene, isopropylether, propylbenzene, styrene, trimethylbenzene, tetraethyl lead (TEL), low molecular weight PAHs (polyaromatic hydrocarbons such as naphthalene, methylnaphthalene) and high molecular weight PAHs (fluoranthene, phenanthrene, and pyrene).

Chlorinated and brominated hydrocarbons such as bromoform, bromodichloromethane, carbontetrachloride, chlorodibromomethane, chloroform, dibromochloropropane, dichloroethene (DCE), dichloroethane (DCA), ethylenedibromide, trichloroethane (TCA), trichloroethene (TCE), tetrachloroethane, and tetrachloroethene (PCE), and polychlorinated biphenyls (PCBs).

Typical Physical Properties*

Carbon Tetrachloride Number	55% (minimum)
Apparent density (dense packing)	30-31 lbs/ft ³
Hardness Number	95 (minimum)
Moisture Content (as packed)	2% (maximum)