



USFilter Westates
 30 Technology Drive
 Warren, New Jersey 07059-0920
 Phone #: 800/659-1717 (xt. 6071)
 Fax #: 908/668-0610

CUSTOMER: Robert Kunzel
 Ground/Water Treatment Technology, I
SITE: NYC, NY
ADDRESS: P.O. Box 1174
 Denville, NJ 07834
VOICE: 973/983-0901
FAX: 973/983-0903

Vapor Isotherm report created on 01/09/02 at 12:55 by Christopher Rinaldi.

VAPOR PHASE ISOTHERM DESIGN PARAMETERS

System Temperature	70.0000 °F
Air Flow Rate	8200.0000 SCFM
System Pressure	14.7000 psi
Relative Humidity	90.0000 %

VAPOR PHASE DESIGN

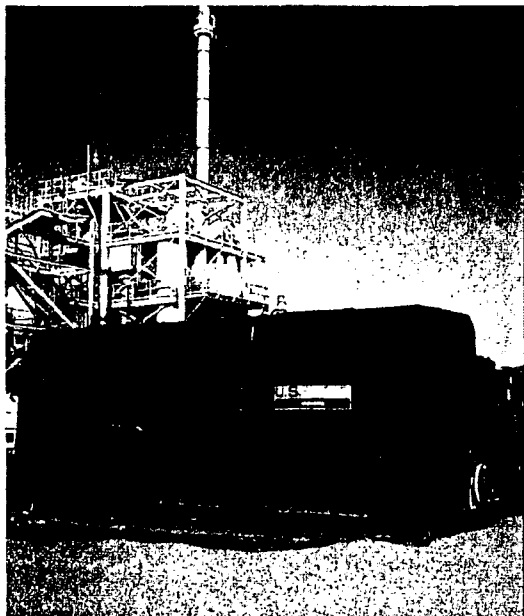
Component Name	Concentration	#GAC/day at Breakthrough
MTBE	0.1000 ppmv	101.5691

Total Carbon Usage Estimated at Breakthrough
 101.5691 #GAC/day

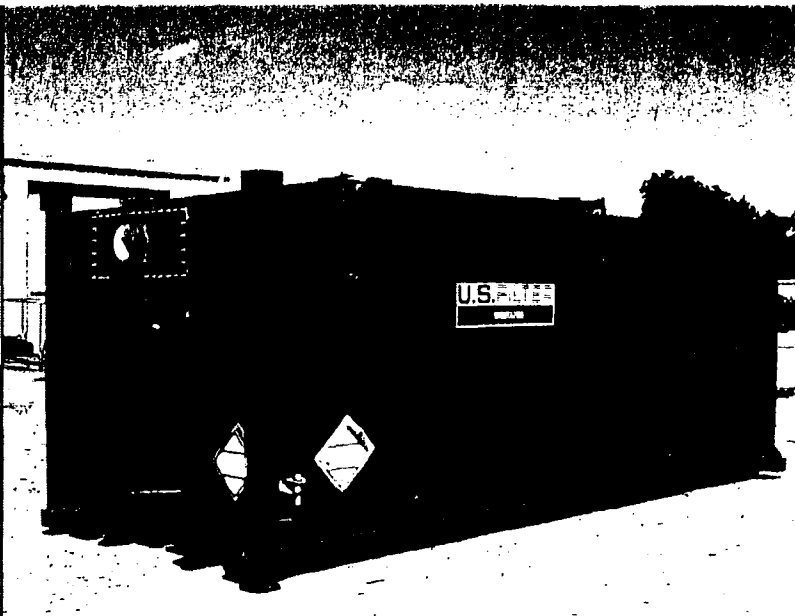
*CARBON
 USAGE RATE*

* indicates that Relative Humidity was calculated
 - indicates that Relative Humidity was approximated
 The above carbon usage estimates are based on both experimental data as well as predictive models. Actual carbon usage rates observed at various stages of breakthrough depend on many factors, and may therefore differ from the above estimates. Please contact Westates Carbon Products for further assistance.

RB-SERIES VENT-SCRUB™



RB-20



RB-10

COMPLETE TURNKEY SYSTEM AND SERVICE FOR VOC CONTROL

Benefits and Features:

- RB-Series eliminate the need for on-site carbon handling.
- Available for sale or rental.
- No on-site equipment required for loading or unloading.
- Various inlet/outlet connection adapters available at no additional costs.
- Supplied with virgin (or reactivated) granular or pelletized carbon.
- Monitoring services can be provided by U.S. Filter/Westates.
- Complete turnkey services.
- Custom RB systems can be designed to meet your needs.

The RB-10 and RB-20 are well suited for the removal of VOC's from high flow air streams and other emission control applications. Some typical applications for the RB-Series adsorbers include industrial plant emissions, soil vapor extraction (SVE) remediation

system off-gases, filtering emissions from waste processing operations and VOC removal from air stripper off-gases. The RB-Series adsorbers are transported loaded with 10,000 to 20,000 pounds of granular (or pelletized) activated carbon.

Deep carbon bed depths (a minimum of three feet) allow for the efficient removal of a wide range of VOC's, even during periods of peak concentrations. These units are capable of treating streams with flow rates of up to 10,000 SCFM. U.S. Filter/Westates provides complete turnkey services that include spent carbon removal, profiling, transportation and reactivation.

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RB-SERIES

VENT-SCRUB™

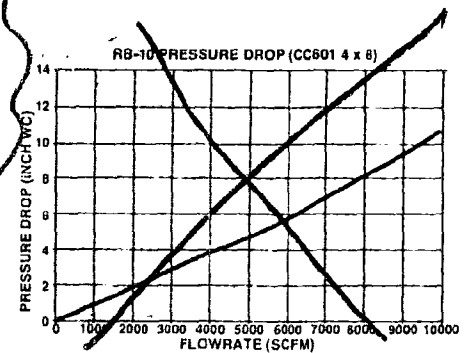
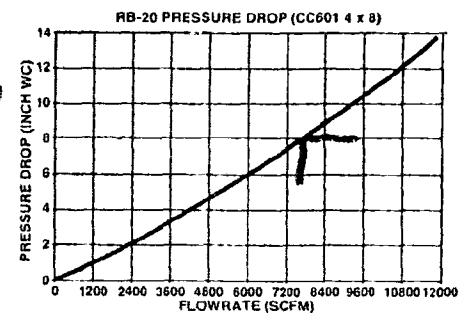
SPECIFICATIONS:	RB-10	RB-20
Outside Dimensions (LxWxH):	19'-9" x 8'-0" x 7'-9"	23'-7" x 8'-6" x 9'-8"
Inlet/Outlet ⁽¹⁾ (I.D.)	12" x 36"	18" x 48"
Manway	Retractable or Fixed Roof ⁽²⁾	(two) 24" x 48"
Interior Coating	Cross Linked Acrylic	Fusion bonded epoxy
Exterior Coating	Enamel	Enamel
Cross Sectional Area (Sq. Ft.)	133	161
Empty Weight (lbs.)	9500	9500
Approx. Carbon Capacity (lbs.) 3' Bed Depth	12,000	15,000
Approx. Carbon Capacity (lbs.) 4' Bed depth		20,000

OPERATING SPECIFICATIONS:

Flow, SCFM (max.)	8000	10,000
Pressure, inches w.c. (max.)	28	28
Vacuum, inches w.c. (max.)	2	2
Temperature, F (max.)	140	140

⁽¹⁾Can be adapted with 8", 10" or 12" 150# flanged connections for the RB-10 and with 8", 10", 12" or 14" 150# flanged connections for the RB-20.

⁽²⁾Fixed roofs are available with two 24" manways.



Pressure Drop @ 8200 CFM = 8" w.c.

Monitoring and Service

U.S. Filter/Westates can provide monitoring services utilizing the appropriate type of field monitoring equipment. The monitoring method used and equipment required will depend on the types of VOC's being captured and on the regulatory compliance requirements.

The frequency of adsorber exchange will depend on operating parameters that affect carbon loading such as VOC type and concentration, temperature, relative humidity, superficial gas velocity, carbon type (coconut shell or bituminous coal) and other factors. U.S. Filter/Westates offers state-of-the-art computer modeling programs, for carbon usage estimates and optimization of system performance.

When an adsorber exchange is required, a fresh adsorber will be delivered from any one of our four convenient regional locations. The adsorber containing spent carbon is removed from the site using a roll-off trailer and shipped to our reactivation facility where the adsorber is emptied, inspected, refilled and the spent carbon is reactivated and recycled.

Please contact your nearest

U.S. Filter/Westates account representative for a process and economic evaluation of the suitability of using the RB-Series adsorbers in your particular application.

All information presented herein is believed reliable and in accordance with accepted engineering practice. U.S. Filter/Westates makes no warranties as to completeness of information. Users are responsible for evaluating individual product suitability for specific applications. U.S. Filter/Westates assumes no liability whatsoever for any special, indirect or consequential damages arising from the sale, resale or misuse of its products.

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Oakland, CA 800-659-1718

VOCARB™

AIR TREATMENT

CARBONS



Applications:

Cost-effective VOCarb™ activated carbons developed by U.S. Filter/Westates have demonstrated superior performance on an extensive range of air treatment applications. Manufactured from coconut shells, anthracite and bituminous coal, VOCarb™ carbons are available for:

- Chemical process applications
- VOC control from air strippers, soil vapor extraction and air sparge systems
- Tank vent emissions
- Solvent recovery
- HVAC
- Odor Control

Benefits and Features:

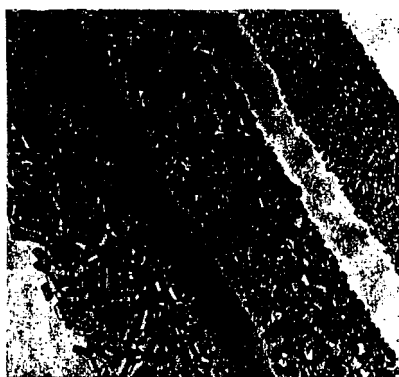
- Superior adsorption and VOC retention characteristics.
- Reactivation services.
- Carbon adsorption system design support.

- Unexcelled quality control and quality assurance programs.

- VOCarb™ activated carbons are suitable for multiple cycles of regeneration and high temperature reactivation, which allow for the reuse of the carbon and eliminates disposal issues.

Quality Control/Assurance

U.S. Filter/Westates in Los Angeles operates a full capabilities carbon testing laboratory that uses ASTM standard test procedures to assure carbon quality. A detailed quality assurance program guarantees consistent quality from lot to lot and shipment to shipment.



Size, shape, pore structure... each VOCarb product is engineered for specific applications.



VOCARB™

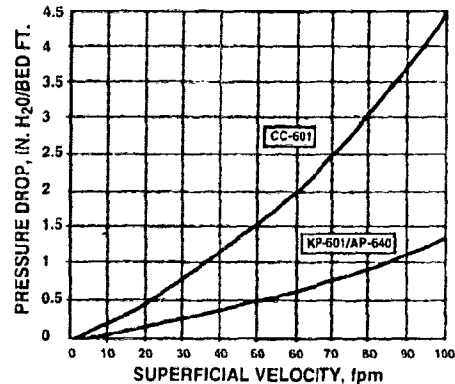
AIR TREATMENT
CARBONS

VOCarb™ Activated Carbons for Air Treatment Applications

Specifications	CC-601	KP-601	AP-640
Carbon Type	Coconut	Bit. Coal	Anthracite
Mesh Size, U.S. Sieve	4x8	4x6	4x6
Shape	Granular	Pellet	Pellet
Butane Number, wt.% (min.) ⁽¹⁾	23.5	23.5	23.5
Hardness No., wt.% (min.)	97	93	95
Moisture, wt.% (max as packed)	3	3	3
Ash, wt.% (max.)	6	12	8
Typical Properties			
CTC Activity, wt.% (typ.)	65	65	65
CTC Retentivity, wt.% (min.)	>35	22 - 25	25 - 30
Mean Particle Diameter, mm	3.4	4.0	4.0
Surface Area (B.E.T. - m ² /g)	1250	1050	1050
Apparent Density, lb/ft ³	29 - 31	26	30

⁽¹⁾ Butane activity (D5742) has been adopted by ASTM as a replacement for CTC activity (D3467).

Pressure Drop Characteristics



Technical Support

The proper design of an activated carbon adsorption system is dependent on the VOC type, influent concentration, temperature, superficial velocity, relative humidity and other factors. An extensive isotherm database and computer modeling programs aid in carbon selection, usage rate calculations and adsorber sizing.

VOCarb™ CC - 601

A high surface area, high activity coconut shell activated carbon.

CC-601 shows very high VOC adsorption capacity and retentivity. The granular shape allows for lower void fraction and more efficient contact with the gas stream. Excellent hardness means minimal fines generation during loading, use and service.

VOCarb™ AP - 640

A 4mm pelletized carbon manufactured from a high grade metallurgical coal (anthracite). Its high surface area, VOC adsorption capacity, retentivity and low inorganic ash content make AP-640 an ideal general purpose carbon for gas phase adsorption applications. Its pellet shape allows for low pressure drop characteristics.

VOCarb™ KP - 601

A 4mm pelletized bituminous coal based carbon. KP-601 shows high adsorption capacity and excellent low pressure drop characteristics. Manufactured using a unique binder system that enhances VOC release from the carbon surface. Ideal for solvent recovery systems with on-site steam or hot gas regeneration. Excellent carbon for chemical impregnation.

Safety Note: Under certain conditions, some chemical compounds may oxidize, decompose, or polymerize in the presence of activated carbon. This could result in temperature increases sufficient to cause ignition. Therefore, particular care must be taken with compounds having peroxide-forming tendencies.

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VOCarbTM

Air Treatment Carbon

SCC-601, 4x10 (Reactivated)

Analysis

Type
PSD, U.S. Standard Mesh Size
Iodine Number, mgI₂/g
Butane Number
Hardness Number, wt%
Moisture, wt%
Bulk Density, g/cc
Total Ash Content, wt%

Specifications

Reactivated Coconut Shell
4x10 mesh, 5% max over, 5% max under
1050 min
21.6 min
97 min
3% max
0.45-0.50
6.0% max

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