

Onion Paper

An Onion Enterprise Newsletter

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Virgin Vs Regen

Do you know the Difference?
Are you paying too much for your
site remediation?
The answers to these questions are
on page 3.

OE 's Vapor and Liquid Carbon System

Onion Enterprises sells and rents vapor and liquid carbon treatment systems to cost effectively abate your contaminated vapor and liquid.

OE provides a full service with our new site **PICKUP-Process**. OE provides these products as components or as part of a large system. OE has a diverse line of activated carbon products including coal, coconut shell, bone char, petroleum pitch, wood base carbons and synthetic adsorbors. Several of these technologies are listed below:

- ◆ **Virgin Liquid/Vapor phase Carbon**
- ◆ **Regenerated Carbon**
- ◆ **Carbon Vessels from 200-20,000 LB**

If you have a vapor problem please contact the OE team of experts **Toll Free 877-566-7007** or fax us at 941-596-3768

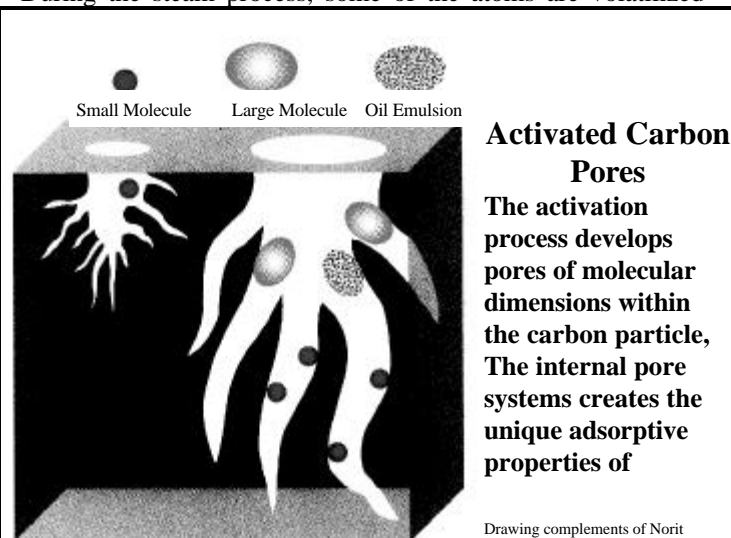
New Web site at www.onionenterprises.com

Granulated ACTIVATED CARBON *The Facts*

PRINCIPAL Granulated Activated Carbon(GAC) is a porous sponge-like substance. Carbon technologies are used to treat contaminated liquid and vapor streams. The technology involves passing these fluids through a media bed with a large surface area. The large surface area on the carbon is where the chemical compounds are held. Activated carbon has more surface area per gram than other materials. The surface area ranges from 500-2000 m²/g. Because of the diversity in porous area, carbon has a wide range of contaminants that it can treat. The adsorption potential of contaminants to the carbon surface is controlled by van der Waals forces, that is the weak attractive forces between molecules. GACs adsorb organic material due to the attractive forces between the GAC surface(non-polar) and the contaminant(non polar) are stronger than the forces keeping them dissolved in water or diffused in vapor.

GRANULATED CARBON ACTIVATION Most Carbon is activated using steam. Activation is also accomplished using chemicals. Wood based carbons steam activation involves a two step process, carbonization and activation. Carbonization occurs in an oxygen deficient environment at high temperatures, 700 degree Celsius. Activation of carbon occurs by using steam where temperature of the carbon is raised to 1800 degrees.

During the steam process, some of the atoms are volatilized



Granular Activated Carbons: The Facts

Key factors in affecting Carbon Absorption Performance

Several parameters can effect influence carbon absorption performance and should be evaluated as part of the design process. They include the competitive absorptive nature of different compounds, temperature, pH and solubility.

- **Competitive Adsorptive:** Strong carbon bound organics can actually push off weaker organics. This process is referred referred to as the "roll off phenomena". The organic compound is often found in the effluent as breakthrough driving carbon consumption up. Software programs are used to estimate carbon loading equilibrium with several different compounds and predict carbon usage.
- **Temperature:** In vapor phase carbon the ability for carbon is diminished by as much as 20% at 90°F and stops adsorbing and starts to desorb at 125°F. With a liquid the greater the solubility of a compound the more difficult it is to with carbon as the temperature goes up, generally the solubility goes up and the adsorptive capabilities go down.
- **pH:** As the pH of water goes down the solubility organic compounds in water go up and the ability of carbon to adsorb goes down(see below).
- **Solubility:** The greater the Solubility the

Physical Factors that affect Carbon performance:

- **Surface chemistry:** Carbon of different raw materials and activation methods will produce carbons with differing surface chemistry. The difference in these chemistries can affect the carbons adsorptive abilities.
 - **Purity :** this a function of choice of raw material, the manufacturing process and quality control. In many cases ash content is of concern in remediation process
 - **Particle Size:** The smaller the particle size, the higher the rate of adsorption. The three terms to consider when discussing particle size are: mean particle size, uniformity coefficient, and d_x value, which is a value in microns such that X percent by volume of the particles of a sample are less then the diameter.
- Diffusion effects:** Adsorption of contaminates is time related, which is diffusion controlled. The impurities need enough contact time to diffuse into the internal pore structure .
- The longer the contact time the more adsorption occurs and higher percentage of the removal of the contaminant
 - **Total Ash Content.** The measure of the amount of mineralized content in GAC, this parameter is misleading by itself because the soluble ash content is more important then the total ash content for water treatment applications. TO minimize ash content acid wash varieties are available.
 - **Abrasion/hardness number.** This is a relative measure of the ability of granular carbon to resist attrition during handling and operation. The higher the value, the more resistant to physical degradation.
- Apparent or bulk density:** Measured in g/ml or pounds per cubic foot, this is used to to determine the weight of a fixed volume of activated carbon.

Carbon Vessels for Liquid and Vapor

Shown below are Liquid and vapor from 200 to 2000 lb.



Onion Enterprises provides carbon units up to 60,000 LB for sale or rent.

ONION ENTERPRISES

Call Toll Free
877-566-7007 for
more information

Reactivated Carbon VS Regen

Reactivating carbon is a simple process where the spent carbon is thermally reactivated. Reactivation occurs at temperatures between 1400-1700°F where either volatile organics or oxidized off forming CO₂ and water. The non-volatile organic compounds are carbonized to form char. In the final phase of the process steam is used to reactivate the carbon. Approximately 80-90% by dry weight of the carbon is recovered in this process. The remainder is made up with virgin carbon. Reactivated carbon performs exactly the same in adsorptive capabilities as virgin carbon.

The advantages of using reactivated carbon are:

- Cost Effective. Reactivated carbon costs are 25-50 percent lower than virgin carbon
- Using reactivated carbon is one of the environmental benefits since the carbon is not going to a land fill but is recycled.

How can the savings add up look at the adjacent table :

Virgin Verses Regenerated Carbon Are you Paying too Much? See the Table Below for the answer

| Two 10,000 liquid Carbon | Virgin Carbon \$0.72 LB | Reactivated \$0.52 |
|---------------------------------------|-------------------------|------------------------|
| Initial Fill | 14400 | 10400 |
| 3rd month 10000 LB vacuum refill | 7200 | 5200 |
| 6th month 10000 LB vacuum and refill | 7200 | 5200 |
| 9th month 10000 LB vacuum and refill | 7200 | 5200 |
| 12th month 10000 LB vacuum and refill | 7200 | 5200 |
| Annual Total | \$43,200 | \$31,200 |
| Savings | | \$11,000 or 35% |

Onions Everyday Low Pricing on some of our Common size filters.

| Model | Description | Price |
|----------|---|--------|
| AF 55 | Liquid Phase 55 gal Drum Capacity up to 18 gpm | \$368 |
| AF 500 | Liquid Phase Vessel 500 lb Capacity up to 25 gpm | \$1665 |
| AF 1000 | Liquid Phase Vessel 1000 lb Capacity up to 50 gpm | \$3040 |
| AF 2000 | Liquid Phase Vessel 2000 lb Capacity up to 115 gpm | \$4275 |
| VF 55 | Vapor Phase 55 gal Drum Capacity up to 80-200cfm | \$403 |
| VF 55R | Vapor Phase 55-6 Radial Capacity up to 500 CFM | \$594 |
| VFW 500 | Vapor Phase Vessel 500 lb Capacity up 500 CFM | \$2042 |
| VFV 1000 | Vapor Phase Vessel 1000 lb Capacity to 600 CFM | \$3467 |
| VFV 2000 | Vapor Phase Vessel 2000 | \$4560 |

Onions Rental Fleet What's available

- ◆ 500 cfm Thermax, 250 cfm CatOx
- ◆ Liquid Ring Pump to 170 cfm
- ◆ Carbon 500, 1000 and 2000 pound units in liquid and vapor
- ◆ VES 100 to 600 cfm
- ◆ AIRSTRIPPER to 60 gpm
- ◆ Ammonia removal system
- ◆ Sparging system
- ◆ Sound enclosure

Call toll free at any time to get an update of available equipment

877-566-7007