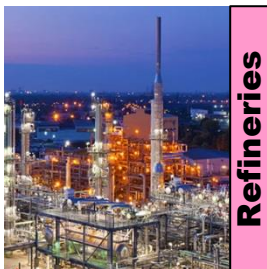


PURIFICATION BY ACTIVATED CARBON

GPE-CAT-03-21082018 - PURIFICATION BY ACTIVATED CARBON



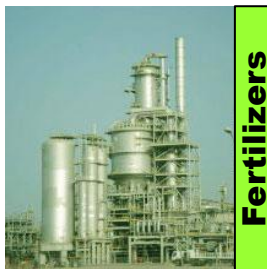
Oil & Gas



Refineries



Steel



Fertilizers



Power

PURIFICATION BY ACTIVATED CARBON

The principal use of vapor phase activated carbon in the environmental field is for the removal of volatile organic compounds such as hydrocarbons, solvents, toxic gases and organic based odors.

In addition, chemically impregnated activated carbons can be used to control certain inorganic pollutants such as :-

- Hydrogen sulfide
- Mercaptan
- Mercury
- Radon
- Dioxine
- Ammonia
- Amine
- Arsine
- Phosphine
- Aldehyde
- Radioactive Iodine
- Radio Active Methyl Iodide
- Acid Gases(HCL,SO2,HF,HCN)
- Nitrogen Oxide and more.



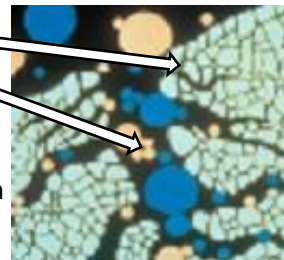
Activated Carbons are non-hazardous carbonaceous product having a porous structure and a large internal surface area and are able to attract variety of substances to there internal surface and are therefore called adsorbent.

They have:-

- External Surface
- Internal Surface

The pore structures are:-

- Submicro < 0.4nm
- Micro < 1nm
- Meso < 25 nm
- Macro > 25 nm



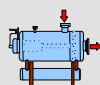
Activated carbons are made from a variety of raw materials like wood, lignite, peat, coal, bones, sawdust, nut shell, petroleum residue, coconut shell. They have a very high adsorption capacity for a wide array of molecules.

The specific surface ranges form 500 to 1500 m²/gm. Due to the hydrophobic character , this is particularly suited to selectively adsorb non-polar organic matter form the gaseous and the liquid phases.

The carbon is loaded in a vessel which called as carbon Adsorber. Adsorbers have been used principally to control the emission of VOC. The control of VOC emissions typically reduces the concentrations from between 400 and 2,000 parts per million(ppm) to under 50 ppm. Adsorption technology can now extend the range of VOC concentration from 20 ppm to one-fourth of the Lower Explosive Limit (LEL). At the lower end of this range, such small concentrations may be difficult or uneconomical to control by another technology or even by all adsorbents. Incinerators, membrane separators, and condensers may be economically feasible when used in place of adsorbers at the upper end of the range. In addition to emission control, the adsorber makes recovery of the VOC possible. Recovery of a reusable or marketable VOC can significantly offset the cost of emission control.

The most common applications of activated carbon are for process gas and off-gases, tank vent emissions, work area air purification, and odor control, either within the plant or related to plant exhausts..

Additionally, activated carbon is used in the hazardous waste remediation are a to treat off-gases from air strippers and from soil vapor extraction remediation projects Toxic air pollutants, also known as hazardous air pollutants (HAP) , are those pollutants that are known or suspected to cause cancer or other serious health effects, reduce air toxics releases of 187 pollutants to the environment. Examples of toxic air pollutants include benzene, which is found in gasoline; Perchloroethylene, which is emitted from some dry cleaning facilities; and Methylene Chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.



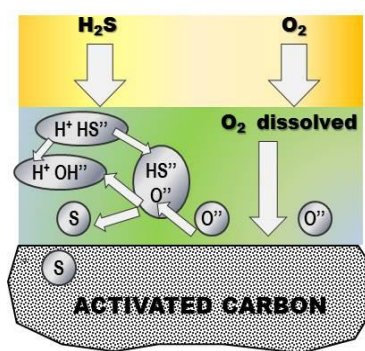
NON IMPREGNATED CARBON

	Gas Phase Adsorption	Liquid Phase Adsorption
Higher Adsorption	<ul style="list-style-type: none"> Higher Molecular Weight. Double Bond/Halogen Non Polar Organic Compound. Low RH (40 TO 70 %) Lower Temperature 	<ul style="list-style-type: none"> Larger Molecular Weight Non Polar Non Soluble or Slightly Soluble. Lower Temperature
Process	Exothermic – in some cases needs precaution to formation of HOT SPOT. Specially for Styrene , Ketone , MEK .	Exothermic

IMPREGNATED CARBON

Activated Carbons are capable of catalytic oxidation and this can be boosted by impregnation of Potassium Iodide , Sulfuric Acid , and various other impregnation .

- Mercury removal
 $\text{Hg} + \text{S} \rightarrow \text{HgS}$
- Hydrogen Sulfide
 $2\text{H}_2\text{S} + \text{O}_2 \rightarrow 1/4\text{S}_8 + 2\text{H}_2\text{O} \quad (- 444 \text{ kJ})$



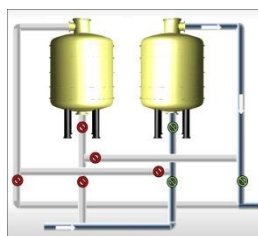
Water film is formed. In this film H₂S and water are dissolved

Oxygen molecules are dissolved on the carbon surface and cracked into reactive radicals

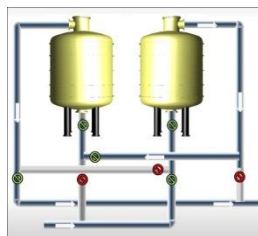
The H₂S molecules are partially dissociated into protons and hydro sulphide ions.

The later reacts with oxygen radicals to form hydroxyl ions and sulphur which is deposited on the activated carbon

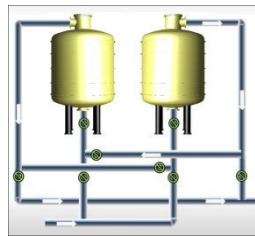
VARIOUS EXECUTION POSSIBILITIES



Single



Lead / Lag



Parallel

- Any flow can be handled with multiple vessels.
- Pre treatment system will be offered.
- Non-impregnated carbon can be regenerated. Please refer our catalogue on VOC Abatement.
- Carbons are selected for specific application

OUR OTHER PRODUCTS

- Gas and Liquid Dehydration
- Diaphragm Compressor Packages
- Gas Screw Compressor Packages
- Coke Oven Gas Purification
- Gas Conditioning Plants
- Methane Enrichment (Bio Gas)
- Hydrogen Enrichment(H₂ PSA)
- Separation / Filtration
- Air Supply Unit
- Nitrogen PSA



Contact – mktg@gasprocessing.in

Web Site – www.gasprocessing.in