VOC's removal using Activated Carbon

Volatile organic compounds (VOCs) are organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point. Some have an odour while others do not. Some common examples include:

- Benzene

- Toluene

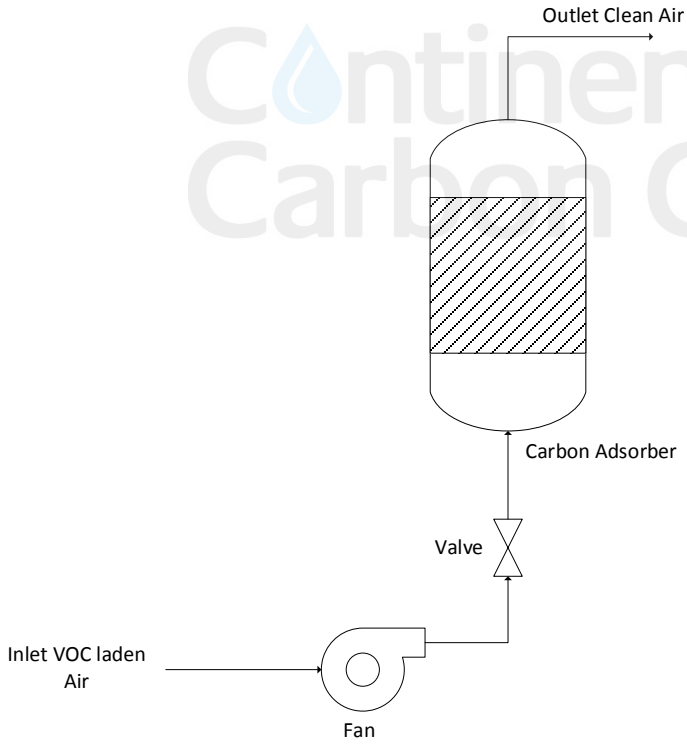
- Xylenes

- Ethylbenzene

- Formaldehyde

CCG Solution for VOC's

Carbon scrubbing units can be provided with blowers designed to pull the VOC through the carbon bed and discharge as purified air from the blower outlet, an arrangement particularly effective in odor control applications.



Activated carbon facilitates in the removal of VOCs by removing contaminants and impurities from the air through chemical adsorption. Acting as a tiny prison cell for VOCs, it attracts and traps them within its porous surface, completely scrubbing these compounds from the air. Activated carbon has a higher success rate in the removal of VOCs from polluted air due to its hardiness and resistance to mechanical

breakdown. Furthermore, it has a higher retention rate due to its extreme porosity in a comparatively small area.

Carbon mesh particle size should be small. A larger particle size means less adsorption or removal of contaminant. Since, VOC's have high vapor pressure they have small contact time with carbon, by making sure the carbon size is smaller mesh, more surface area is exposed for VOC's to get attracted to the carbon surface. Factors to consider when using carbon adsorber for VOC removal including Benzene are:

1) Grain size of carbon to determine the resistance to flow and the total pressure drop across the cross-sectional bed.
2) Total depth of carbon bed. Deeper bed means longer contact time of contaminant with carbon surface for near complete removal from gas streams.
3) Gas stream velocity. Faster velocities will result in shorter empty bed contact times and higher pressure drops.
4) Temperature of the gas mixture. Higher temperature will leave to desorption and the contaminant will revive in the gas stream. Various literatures recommend operating temperature for the adsorber/ scrubber should be kept below 130 F (54.4 C).
5) Pressure of the influent gases. Increasing pressure will result in better adsorption as more gas molecules are immobilised onto the carbon surface.
6) Concentration of target contaminant. Higher concentration will result in faster saturation of the adsorbent bed.
7) Concentration of competing contaminants in the gas mixture. If other contaminants in the mixture have higher molecular weight than the target molecule then, the heavier adsorbates will settle on the carbon surface.
8) Vapor pressure of the adsorbate. Carbon best adsorbs compounds with lower vapor pressure.
9) Moisture/ relative humidity content of the gas stream. Higher moisture content results in reduced adsorption capacity of carbon as the condensing water vapors block the pores where the adsorbates reside. It is recommended that relative humidity during operation is below 50%. If possible.