VOC, BTEX, H2S, SO2, HAPs and Siloxane Emission Control By Carbon Bed Biofiltration System

Introduction

Many industries are currently and have been under fire for some time by employees, local residents and EPA officials to control emissions. These unwanted odors can cause health threats, consequently incorporating new products which have lower emission levels as well as a cost effective remediation method to remove emissions such as carbon bio-filtration system can eliminate the higher cost burden of thermal oxidation while providing a method to reduce public concern and conform to permitting requirements.

What does the carbon due?

So, what is a Granulated Activated Carbon Bio-Filtration System (GACBF)? "GACBF" is a term used to describe a system of trapping the solvents by use of activated carbon filter. This filter "carbon" has a vast surface area with only one gram when spread out equaling the size of a football field, so as you can imagine hundreds of pounds can trap thousands of pounds of solvents. Currently many of these systems are in place, however when the system is filled the carbon will accept no more and the solvents will push through the carbon bed without entrapment.

What is bio-filtration?

Bio-filtration is the naturally occurring process of treating air and water by bacteria and microbes. This filtration occurs naturally in our life's daily, these organisiums are capable of digesting just about any organic substance that either we manufacture or that occurs in nature. The by-products of this naturally occurring biological activity is carbon dioxide and water.

Conventional biofilters have used these methods for many years; most have been in operation in Japan and Europe. In the past these have been very large operating systems with single layer mulch or organic media to act the filtration mechanism. Some as large as soccer fields, the size has limited its popularity in the U.S. and most were found to be impractical for industrial units.

Newer more modern designed biofilters use a variety of products to increase their efficiency of treating a variety of emissions and thus reduce their size from something like a soccer field to a dining room table. Emission laden off-gas waste stream is required between 40°F and 120°F to maintain proper metabolism by the organisms. Second, the carbon that supports the entrapment is structured in a way to increase the effective surface area and allow multiple layers. A concise way to put it is the system is an engineered bionetwork where the organisms believe they are at a luncheon that never ends with organic solvents and odors becoming their main staple.

Thermal Oxidation v. Carbon Bio-Filtration Technology Costs

Often process streams have a high volume waste with lower levels of emissions. These emissions can be extremely expensive to treat with thermal oxidation technologies because of the amount of natural gas required to maintain combustion temperatures of typically 1500°F. Some Thermal technologies also produce secondary contaminants like nitrogen oxides, as do the regeneration systems for activated carbon.

Biofilters make use of the biological energy of the microbes to destroy the VOCs without creating secondary pollutants. The energy costs for a carbon bio-filtration system are one-tenth the energy costs of thermal oxidation technologies. Capital cost expenditures of a carbon biofilter are typically two-thirds to three-fourths that of competing thermal oxidation technologies.

Carbon bed biofilters are living microbial systems, maintenance of the system by addition of micro organisms is required after one month to 12 months depending on the removal efficiencies above 98% for regulatory compliance. When comparing turning a knob for a mechanical thermal oxidation processes. Often the regulatory approach has pushed toward Best Available Control Technology (BACT), which leans towards requiring a higher level of treatment for the target pollutant with only narrow contemplation of the cost. Carbon bed bio-filters are currently achieving consistent removal efficiencies greater than 99 percent.

Carbon Bed Biofiltration is an energy-efficient technology for VOC, HAPs and Odor control that can meet the demand of these and many other situations. Regulatory agencies are more receptive to biofiltration, and are beginning to recognize the benefits of pollution avoidance and energy savings.

Industrial Paint Booths

A 7000 scfm Carbon Bed Biofilter was placed on paint spraying operation in Tennessee coater of metal and components. Coatings with relatively high concentrations of VOCs are often necessary for this industry. This bio-filter system, pictured below is maintaining greater than 98% removal of VOCs.

Conclusion

Carbon Bed Biofiltration is a cost-effective and viable technology for VOC, BTEX, H2S, SO2,HAPs, Siloxanes and odor control that has significant promise for improved air quality for facilities involved in high emission levels such as printing, chemical, paint and coatings industry. Carbon Bed Biofiltration systems provide effective destruction of air pollutants with very low energy consumption with little secondary pollutant generation. Applications for this technology are increasing through a wider range of industrial applications.

For more information about the Filtercrobe® or specific destruction efficiencies as it may relate to your specific emissions, please contact American Environmental Fabrication & Supply at www.american-environmental.us or call +1 918 708-1253. Representatives will be happy to discuss conversion of older technologies or new system applications