



## **Landfill Biogas Bio-Reactor System**

The landfill gas bio-reactor system has been designed to remove siloxane, hydrogen sulfide and organic chlorinated hydrocarbons from the biogas. The carbon bed filter utilizes a system that entraps the unwanted biogas contaminants while allowing all but very small percentage <.0003% of the methane to escape as cleaned fuel.

After the carbon bed entraps the biogas contaminants they are further delivered by rotation to a water bath area which is used to remove the biogas contaminants from the carbon filter beds. This is a continual carbon bed washing operation, so future removal of the carbon bed filter is never required and the carbon may be in the active state for up to twenty years. The wash bath process stage is an area where the bio-gas contaminants are subjected to a very specific grouped set of microbes to digest contaminants as nutritional food source.

The process bio-gas flow passes thru the carbon bed filtration system and emerges as high quality methane gas free of compromising compounds to the generation system. This cleaned methane fuel is further processed to a confinement tank to eliminate any excess moisture from the landfill operation that could be detrimental to the engine or micro turbine combustion process. Any cleaned trapped moisture may be disposed of with the leachate or placed back into the landfill.

### **Description**

The bio-reactor system is fabricated using stainless steel in the areas of direct exposure to the bio-gas contaminants. The landfill bio-gas enters the first of many granulated carbon chambers where the contaminants are trapped. The contaminants are trapped, the processed methane gas continues to exit the carbon bed filtration system. As the purified methane gas vapor leaves the carbon filtration system the vapors flow thru a confinement tank to further collect any moisture not collected by the carbon beds. The confinement tank is equipped with a purge system to allow continuous operation.

In the second phase of filtration, the carbon bed tower revolves within the stainless steel cylinder. As the cylinder rotates it passes a water bath which removes the ongoing contaminants from the carbon bed and processes these contaminants within the water bath as nutrients to the selected microbes (food source). These microbes continually digest the contaminants. The only byproduct of the digestion is water and CO<sub>2</sub>.

The microbial activity creates no sludge and requires no special wastewater treatment. The microbial colony must be replenished twelve times per year depending on the amount of contaminants in the process stream. The cost associated with the microbial change out is \$150.00 per pound. Typical microbial amounts on a large system are two pounds. They are in a dry power form and have a shelf life of up to five years. Changing the microbes requires less than one hour of employee time.



The filtration system requires no down time, other than normal mechanical maintenance on the blower and the rotating motor. The filtration system operates with a forced draft blower on a variable frequency drive to control and regulate the process amounts from the collection system. The system requires no fuel and only minimal amount of electricity.

From analyses carried out, the system is able to eliminate the siloxane; H<sub>2</sub>S, SO<sub>2</sub> and chloride content by at least 98%. Guaranteeing a more pure methane combustible gas providing endless benefits to the owner/operator including reduced maintenance intervals and longer power generating life.

For every emission application the operation parameters are defined including the process temperature, microbial amount, differential gas pressure between the intake and outlet, and service time for adding the microbes in order to ensure that the system operates at optimal efficiency. Both the post collection basin as well as the wash basin is equipped with inspection windows to quickly verify the fluid level and the state of cleanliness.

The blower, cylinder rotation motor and all other system parameters may be controlled via a programmable logic controller (PLC), if facility requires a more controlled system. In addition, it is very easy to integrate into the ability to monitor and modify the operating parameters via internet.

## **Conclusion**

The carbon bed microbial biogas reactor system offers a low maintenance, low cost solution to the removal of biogas contaminates. With superior efficiencies and simple patented design the system offers years of reliable service at a small percentage of comparative equipment costs.

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