HOMEBIOGAS® BIOGAS AND FILTRATION INFORMATION BROCHURE

DESCRIPTION

The HomeBiogas system produces biogas, which is produced through the natural fermentation of organic matter in an anaerobic environment. Biogas is a majority methane gas that can be used for cooking or heating. The gas is typically filtered pre-combustion.

FILTER

The HomeBiogas filter is equipped for efficient hydrogen sulfide (H_2S) removal from the stream of biogas. H_2S should be removed before usage because it can cause corrosion in metal pipes and is unsafe for human health in high concentrations. Our filter uses activated carbon (AC) to remove H_2S and volatile organic compounds from the gas stream.

AC is a strong adsorbent due to its highly porous structure. It additionally acts a catalyst for sulfur oxidation, which further removes H_2S from the gas stream. Our AC pellets have been treated an alkaline coating of potassium carbonate and potassium hydroxide in order to optimize chemical adsorption.

ODOR

H_2S is naturally present in the gas stream at around 300 ppm, and after filtration is reduced to under 0.1 ppm. The smell of H_2S, which has a characteristic odor of hard boiled eggs, is detectable to the human nose at a level of 0.01ppm and above. The biogas produced by the HomeBiogas system post-filtration will still maintain a low level of this odor because the odor threshold is less than the amount left after filtration. This small amount of odor can serve as a first line of alert to a customer if gas is leaking from the system.

The trace H_2S in the gas stream serves the same function as mercaptans, another type of sulfuric compound, which are added to natural gas as a safety measure. Because of the low level of H_2S, there is no risk of pipe corrosion or adverse health effects, and the odor is similar to any cooking gas. When combusted, gaseous H_2S undergoes the following reaction:

$$2H_2S + 3O_2 \rightarrow 2SO_2 + 2H_2O$$

In the small amount present after combustion, the product of sulfur dioxide (SO_2) will not have an odor detectable to the human nose, and poses no health risk.

PROPERTIES

Compound	Formula	Amount Present in Raw Biogas Stream*
Methane	CH_4	55-65%
Carbon Dioxide	CO_2	35-45%
Nitrogen	N_2	0-10%
Hydrogen	H_2	0-1%
Oxygen	O_2	0-0.5%
Hydrogen Sulfide	H_2S	0.00001% (0.1 ppm)

*The exact ratio of gases present in the biogas stream is dependent on the type and quantity of waste inputted to the system. The ratio of H_2S is typically constant because it is measured post-filtration.

SAFETY

Methane has a smaller molecular weight than air, so it floats directly up into the atmosphere if it escapes. Additionally, the gas in the system is stored at a relatively low pressure, so in case of accidental fire, there is negligible risk of explosion.

HOMEBIOGAS

HomeBiogas, based in Israel, is a leading company for the most efficient, cost-effective, low-maintenance, and durable household biogas systems in the market. With over 10 years of research and development, HomeBiogas is determined to bring the Biogas facility to every home in the world.