An Ovivo Company

DIGESTER GAS CLEANING/ DRYING EQUIPMENT

VAREC BiogasCleaner
H_2S REMOVAL SYSTEM

The BiogasCleaner is a biological H_2S Removal System.
Developed by BioGasclean A/S, a Danish private corporation located in Odense, Denmark

Introduction

H_2S removal is one of the key steps when biogas is recovered and used to run engines to generate electricity. In order to ensure a long engine life and maintain the manufacturer's warranty, it is necessary to remove water and harmful contaminants before the gas is burned in the engine. The biogas typically goes through the following treatments:

1. Removing the H_2S – using either our Model 235 or Model 236 Gas Purifiers or the BiogasCleaner.

2. Chilling and drying the gas – See our Model 237 Gas Chiller Drying System.

3. Siloxane removal – as a final step when and if required.

Which type of H_2S removal system to choose will depend on how much sulfur needs to be removed. While iron sponge is an economical alternative for low flows and concentrations, biological H_2S removal handles higher flow rates and higher concentrations of H_2S without costly media replacement

Because the biological system uses sustainable bacteria, the media does not need to be replaced resulting in an overall lower operating cost. The only residual product from the biological process is a liquid sulfate solution that is normally mixed with the treated effluent or biomass from the digesters and recycled to the fields as valuable S-fertilizer.

BioGasclean has a worldwide installation base which complements Varec Biogas.

Process

The hydrogen sulfide (H_2S) is removed from the biogas in a biological process. The sulfur oxidation bacteria thrives and multiplies on a packed media inside a closed acid-proof tank.

The bacteria requires sulfur from the H_2S, carbon from the CO_2, oxygen from atmospheric air, water and nutrients (nitrogen, phosphorus and potassium) from the treated effluent and a temperature between 86°F - 130°F (30°C - 55°C).

The sulfate is discharged with the effluent from the gas cleaner which contains up to 8% SO_4. The chemical composition of the effluent will depend on the water or treated digester effluent added to the process.

In order to sustain the bacteria, atmospheric air is injected into the gas cleaners.

The amount of air required depends on the H_2S level in the raw biogas. The volume of methane will remain unchanged and the air injection will dilute the relative CH_4 content in the clean gas proportionally.

A frequency-regulated air blower is used for adjustable air injection. The main part of the O_2 is used for oxidation of the H_2S to SO_4, and the oxygen in the clean gas will be well below the flammable limits of the gas.

The effluent from the BiogasCleaner is mixed into the treated waste water or degassed manure and recycled to the field. It is also possible to mix the effluent with compost at a composting facility. The volume of effluent is small compared to the volumes of treated water and substrate from the digesters and the pH is neutralized quickly.

Specification

QSR® (QUICK SLUDGE REMOVER)
All filters must be cleaned to preserve their efficiency and avoid clogging and operational interruptions. The BiogasCleaners are constructed so that the filter can be completely cleaned in one to two working days without removing the packing media from the tank.

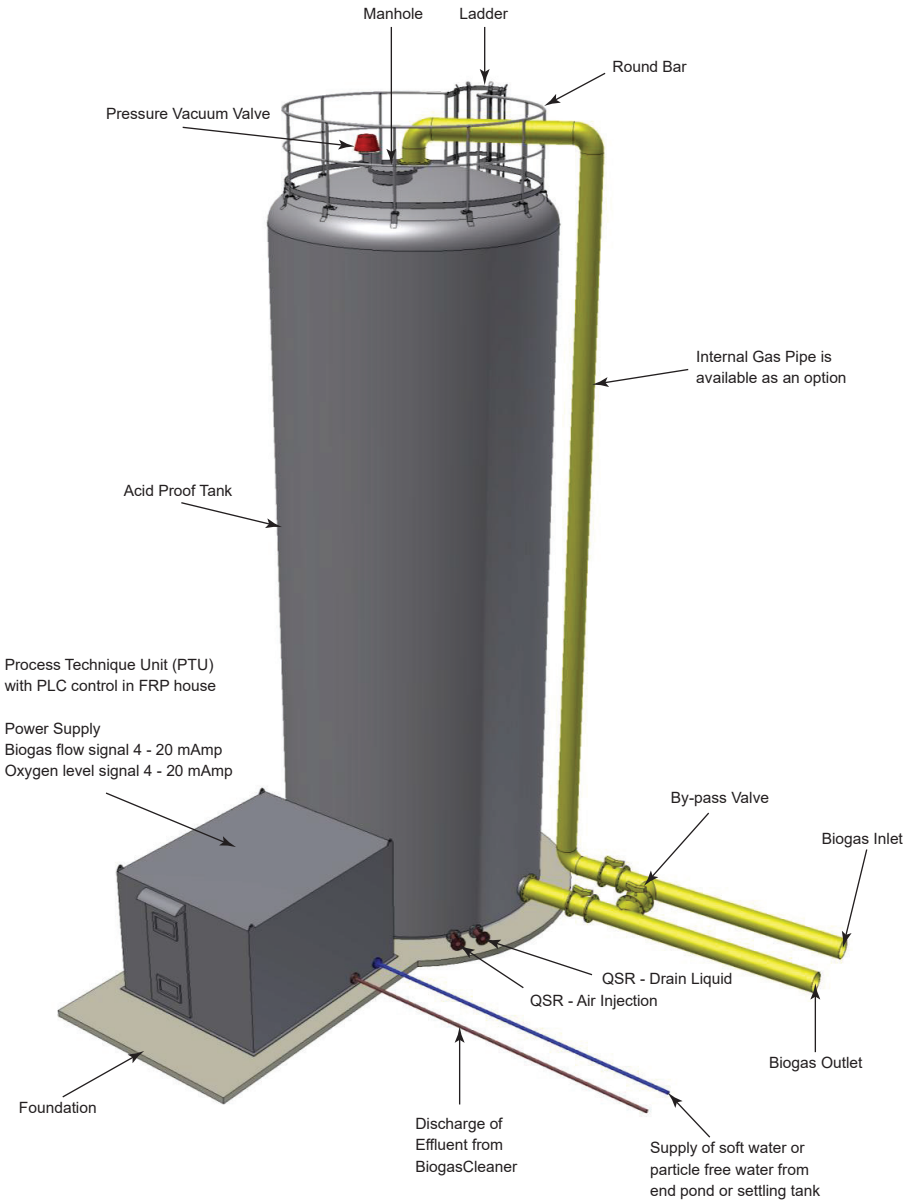
The system is called QSR® (Quick Sludge Remover) and is unique to the BiogasCleaner system.

The BiogasCleaner H_2S scrubbers are NFPA compliant, low flame spread rated FRP tanks that are normally supplied with ladders and platforms. The tanks can be provided with insulation cover.

The appurtenances, e.g., pumps, blower, and control panel are installed in a pre-fabricated housing for installation adjacent to the tank. This simplifies operations and maintenance requirements and insures all components are installed properly.

All key-components, sub-systems, PLC control, etc., are installed in a Process Technique Unit (PTU) built into a pre-fabricated housing. All components and systems are manufactured to meet NFPA 820 and UL standards.

Consult factory or your authorized sales representative for ordering information. The attached inquiry form will assist us in determining the proper equipment to meet your gas cleaning needs.



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BioGasclean Inquiry Form

Customer:
Project Name:
Project Location:
Time Schedule: ☐ Engineering/ Design ☐ Budgetary ☐ Feasibility Study ☐ Bid
Substrate for Gas Production: e.g. animal manure, waste water, sewage, palm oil, cassava, sugar cane, food processing, landfill, other?
Usage of Clean Gas: e.g. gas engines, boiler, direct drying, upgrading to CNG or NG?
Gas Flow in Nm^3/h or scfm:
Expected variations in gas flow over 24 h: i.e. 50 - 100%, 80 - 100%, 0 - 100%
Composition of gas: e.g. CH_4, CO_2 and H_2S in %
H_2S in ppmv or mg/Nm^3 in raw gas:
H_2S in ppmv or mg/Nm^3 needed in clean gas:
Gas inlet temperature: **Gas inlet pressure:**
Seismic Zone: e.g. UBC zone 0, 1, 2A, 2B, 3 or 4?
Wind Load: e.g. <100 mph (160 km/h), 100-130 mph (160-210 km/h) or >130 mph (>210 km/h)?
Ambient Temperature: Minimum, Average and Maximum:
How are treated waste water / biomass utilized or disposed of?
VAC/Frequency:
Is moisture removal required?
Is siloxane removal required? What are the inlet siloxane concentrations?
Is gas compression required? What discharge pressure is required?
Other Information / Comments:

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