

TECH NOTES

VB-TN-015

August 16

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Varec Biogas + BioGasclean A/S A Partnership in H₂S Removal Systems

Varec Biogas is pleased to announce a partnership with BioGasclean A/S, a Danish private corporation located in Odense, Denmark. BioGasclean develops, manufactures and markets biological H₂S scrubbers.

The partnership will allow Varec Biogas to provide a complete package for digester gas cleaning in municipal wastewater or industrial wastewater. H₂S removal is one of the key steps in cleaning when biogas is recovered and used to run engine generators. The biogas typically goes through:

1. Removing the H₂S - either with the BiogasCleaner or our Model 235 or Model 236 Gas Purifiers .
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.



The biological H₂S removal process will enhance our ability to handle higher flow rates and higher concentrations of H₂S. The media used is more cost effective than iron sponge providing for a longer bed life resulting in an overall lower operating cost. The only residual product from the biological process is a liquid sulfate solution. This is normally mixed with the treated effluent or biomass from the biogas digesters and recycled to the fields as valuable S-fertilizer.

BioGasclean has a worldwide installation base which complements that of Varec Biogas. The partnership will enhance Varec Biogas product offering to include the products necessary to address the ever growing demands for gas cleaning for efficient biogas recovery and use.

Process

The hydrogen sulfur (H₂S) is removed from the biogas in a 100% biological process. The sulfur oxidation bacteria lives and multiplies on a packed media inside a closed acid-proof tank. It requires sulfur from the H₂S, carbon from the CO₂, oxygen from atmospheric air, water and nutrients (nitrogen, phosphorus and potassium) from the treated effluent and a temperature between 86-130°F (30-55°C).

The sulfate is discharged with the effluent from the gas cleaner which contains up to 8% SO₄. The chemical composition of the effluent will depend on the water or treated digester effluent added to the process.

Injection of atmospheric air

Atmospheric air is injected into the gas cleaners. The amount of air required depends on the H₂S level in the raw biogas. Approximately 7.5 % air is needed for 3,000 ppm of H₂S. The volume of methane will remain unchanged, and air injection into the process will dilute the relative CH₄ content in the clean gas proportionally.



A frequency regulated air blower is used for adjustable air injection. The main part of the O₂ is used for oxidation of the H₂S to SO₄, and the oxygen in the clean gas will be between 0.5 and 1.5%.

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.

The BiogasCleaner H₂S scrubbers are reinforced fiberglass (FRP) tanks that are normally supplied with ladders and platforms. The tanks can be provided with insulation cover. Pumps, blower, PLC controller, etc., are installed in a prefabricated housing, adjacent to the tank. This simplifies operations and maintenance requirements and insures all components are installed properly.

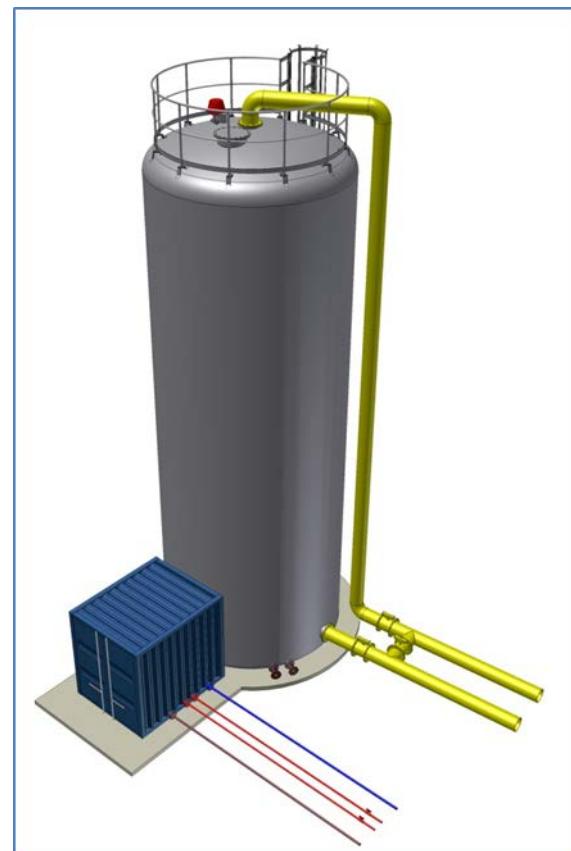
All key-components, sub-systems, PLC control, etc., are installed in a Process Technique Unit (PTU) built into a 20' or 40' container.

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.

Please contact your local Varec Sales representative for more information on this exciting new offering, or for more information on any Varec Biogas product. To find your local representative please go to our website www.varec-biogas.com.

The attached Inquiry Form will assist us determining the proper equipment to meet your gas cleaning needs.





Varec Biogas

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BioGasclean Inquiry Form

Customer:	
Project name:	
Location of project:	
Time schedule: <input type="checkbox"/> Engineering/Design <input type="checkbox"/> Budgetary <input type="checkbox"/> Feasibility Study <input type="checkbox"/> 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. CH₄, CO₂ and H₂S in %	
H ₂ S in ppmv or mg/Nm ³ in raw gas:	
H ₂ S 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:	



Toll Free 1-866-4BIOGAS