DS-BTR: Automated Proven Performance

Desulphurisation - Bio Trickling Reactor

Biogasclean is a leading supplier of biological desulphurisation systems for biogas. Our solutions are designed to handle a wide range of gas flows and H_2S concentrations across agricultural, industrial, landfill, and wastewater applications - for both greenfield and brownfield projects. The process is fully biological, delivering system availability above 98% while achieving operating costs typically 80-90% lower than conventional chemical gas purification systems.

How it works

Biogas and a controlled amount of air are introduced at the top of the reactor. A recirculated scrubbing liquid trickles down through structured packing material, providing optimal moisture and nutrients for the naturally occurring sulphur-oxidizing bacteria.

As the gas passes through the packing, hydrogen sulphide (H_2S) is biologically oxidized. The process liquid is continuously recirculated, with periodic water and nutrient dosing to maintain stable operation.

The system produces a nutrient-rich bleed stream (biogenic sludge), which can be safely removed and utilized as fertilizer.

Applications

- Power generation in gas engines or Combined Heat & Power (CHP) systems
- Biomethane upgrading and grid injection
- Fuel production for heavy-duty transport and maritime applications
- Gas storage or liquefaction for transport and distribution

Key Highlights

- Proven performance up to 6,500 Nm^3/h biogas capacity
- Handles inlet concentrations up to 30,000 ppm H_2S
- Fully automated operation with high process stability
- >98% availability guarantee
- Low CAPEX and industry-leading OPEX profile
- Modular design with optional polishing and redundancy systems

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Technical Specifications	
Process Tecnique Unit (PTU)	Engine room containing a PLC controller board, a circulation pump, an air blower, valves, flow meters and, if required, a gas detector and a heating system installed either in a skid or in a custom-made fibreglass container. The system is automatically controlled by the PLC controller board, reducing the risk of manual errors. It provides stable conditions for the biological process and ensures a safe, reliable production process.
DS BTR reactors	Reactors are made of high-quality fibreglass and include a grating, allowing for easy inspection underneath the packing media. They are supplied with a ladder, a handrail and, if required, insulation. The tank can be filled with water.
Quick Sludge Removal (QSR)	During QSR cleaning the tank is filled with water and pressurized air is injected in the bottom of the tank, so the packing media is washed as if in a big washing machine. The QSR system makes it possible to clean the tank for sulfur and gypsum sludge without emptying the tank for packing media. This reduces downtime and increase revenues.
Cleaning options	**DS BTR QSR:** Fully automated cleaning in place. Closed PTU (CE marking, UL marking). **DS BTR QSR LTE:** Reduced automation. Primarily for APAC. Open PTU. (No CE marking, No UL marking) **DS BTR Basic LTE:** Manual cleaning process. No QSR. Open PTU (No CE marking, No UL marking).
BTR Packing media (QSR)	Packing media inside the reactor tank creates the perfect biotrickling filter for the biology to thrive. It is made of PP plastic and designed for easy cleaning. With the QSR system, there is no need for the packing media to be exchanged.
Data exchange	The system can provide data for the operator's control monitoring system (i.e. SCADA), and advanced communication protocols make it possible to access the system remotely, without endangering the cybersecurity of the plant.
Safety	Injecting air or oxygen into biogas can only be safe with a reliable control system. The PLC receives signals from an oxygen meter and reduces or stops air injection, if the oxygen content in the clean gas is too high. The safety system removes the ignition source by cutting power supply if the gas detector measures above 25% of the Lower Explosive Level (LEL) of CH_4.
Flow range	Typical BTR reactor solutions feature flow range of 6,500 Nm3/h biogas
Temperature range	The temperature in the process tank is kept between 30 to 50°C (86 to 122°F)
Desulphurisation	Typically, biogas entering the BTR reactor has between 1,000 to 30,000 ppm H_2S and we remove H_2S to below 50 ppm.
Optional Make Up Water System (MUW)	MUW Efficient operation on digested effluent – results in low OPEX. Reducing the risk of clogging further, degassed water can replace nutrients as digestate and with pre-treatment it can be used as scrubber liquid. Treated water reduces costs for water and fertilizer.
Optional Low Ox	Guaranteed low oxygen surplus in the cleaned gas, as low as 0.3 vol%.

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