

Biogasclean MBR - biological desulfurization of biogas and CO₂



Plant: KSL Green Innovation PCL
Thailand

Capacity: 5,000 m³/h
(2,941 scfm) biogas
15,000 ppm H₂S

The MBR technology is especially developed for larger biogas flows produced on wastewater from molasses or cane juice at ethanol distilleries where the biogas has high H₂S loads (15,000-30,000 ppm) in combination with low calorific values (50-55% CH₄). Biogasclean MBR is **patented** and have the following key features:

- **The PTU** – the Process Technique Unit - is the technical equipment necessary for safe and automatic operation. The technical equipment is skid mounted and comprise a.o. gas blowers, gas pre-cooling system, air blower system and liquid supply system. The PLC based control system as well as the frequency converters are installed in an air-conditioned control room.
- **MBR tanks.** Comprise one or more insulated tanks manufactured in high quality fiber glass. Depending on the H₂S volume we use either prefabricated tanks or field erected tanks.
- **MBR packing media.** The raw biogas is – after injection of air or oxygen - bubbled through the liquid containing the high-surface MBR media. The packing media is floating in the scrubber liquid and no special cleaning is required.
- **Foam control.** The foam produced by bubbling the gas through the liquid is controlled by injection of small amounts of palm oil based on online process parameters monitored by the PLC.





Plant: *Power Solution Technologies (PSTC) Thailand*

Capacity: 3,000 m³/h
(1,765 scfm) biogas
15,000 ppm H₂S

MBR (Moving Bed Reactor) versus BTR (Bio Trickling Reactor). If the raw biogas is below 1,000 Nm³/h the BTR will normally be the most cost effective solution, whereas the MBR technology is superior if the flow of raw biogas is above 1,000 Nm³/h

| | BTR (Bio Trickling Reactor) <1,000 Nm ³ /h | MBR (Moving Bed Reactor) >1,000 Nm ³ /h |
|-------------------------------|--|--|
| Main process | H ₂ S (gas) + 2 O ₂ (gas) => H ₂ SO ₄ (liquid) | H ₂ S (gas) + ½ O ₂ (gas) => S (solid) + H ₂ O (liquid) |
| Media type | Fixed bed | Moving bed |
| Tank volume | 100% | 25-30% |
| Service per tank | 6-9 day/year | 1-2 day/year |
| Initial start-up | 48-72 hour | 0.5-2 hour |
| O ₂ consumption | 100% | 25% |
| O ₂ after scrubber | 1.5-2% | 0.5% in Asia and 3% in Brazil |
| CH ₄ dilution | 12-21% | 5-7% in Asia and 14-16% in Brazil * |
| pH of effluent | 1-3 (org. liquid pH 7) | 7 (org. liquid pH 7) |
| Sulfur recovery | Not possible | Possible by means of sedimentation, cyclones or centrifuges |
| Gas pressure of outlet | Typically 10-30 mbar | Up to 150 mbar (no further compression needed) |

*If pure oxygen is used instead of air the CH₄ dilution will only be between 1-2%.

Biogasclean A/S

Biogasclean is specialized in biological desulfurization and methanation of biogas and CO₂. We develop, manufacture and supply fully automated gas treatment systems combining low operating costs with high availability. Our track record comprises +340 plants in operation or under construction in +40 countries. Biogasclean supplies clean gas to +700 MW gas engines and boilers and removes sulfur from +35 biogas upgrading plants for biomethane (RNG).

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