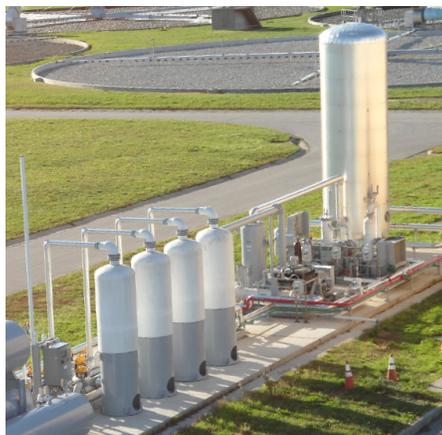


Digester Gas Purification for High BTU Pipeline Gas, CNG or LNG Uses



A Guild System for Digester Purification

The Molecular Gate Technology offered by Guild Associates has been provided for over 35 projects with pipeline quality gas for pipeline, CNG and LNG produced. Use of the technology for digester gas clean-up is growing in popularity with 7 plants provided. Gas from digesters for dairy, wastewater and rendering plants have been upgraded.

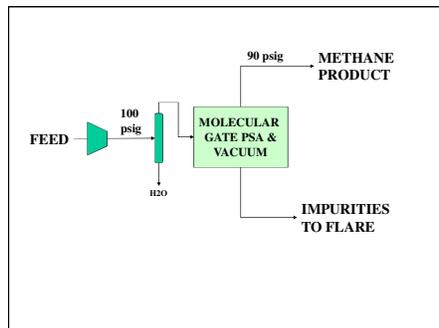
The technology offers the benefits of:

- *Single step removal of impurities*
- *All media is regenerated – no need for replacement*
- *H₂S completely removed from any level*
- *Siloxanes removed to non-detect levels*
- *Dehydration to CNG requirements and no separate dryer required*
- *No chillers used*
- *Dry system operation with no waste product other than condensed water from compression*

The simplicity of operation is critical and operation simplicity includes:

- *Automatic start-up and shutdown at a push of a button*
- *Automatic product purity control without operator attention*

The process steps include feed compression and Molecular Gate PSA treatment.



Feed Compression

The raw digester gas is available at near atmospheric pressure and a Guild packaged oil flooded screw compressor boosts the pressure to 100 psig. These compressors are robust and reliable and operate with oil sealing that permits wide tolerances between the rotors and helps dissipate the heat of compression.

To avoid the condensation of water in the oil, the temperature is automatically maintained. The compressors are automatically protected from any damage due to water condensation without the use of chillers.

The Molecular Gate PSA Process

In the Guild Molecular Gate system the compressed feed at 100 psig is routed through adsorbents that remove water vapor, H₂S, mercaptans, VOCs and CO₂. The methane passes through the bed and is delivered as purified product. Impurities are desorbed through a Guild packaged vacuum pump. The system offers high methane recovery with the rejected impurities sent to a flare for destruction.

H₂S Removal

The Guild Molecular Gate technology is unique since sulfur is removed within the main PSA - *without the use of non-regenerable media*. Thus elimination of sulfur treatment is a major operation and cost savings. In the Guild Molecular Gate system the H₂S is routed to the tail gas and subsequently flared. Where

flaring is not permitted treatment for H₂S on the feed or tail gas is required. Operating Guild units remove H₂S from levels as high as 9000 ppm to pipeline specifications.

Siloxane Removal

Siloxanes are a growing impurity in digester gas and in the Guild Molecular Gate system the siloxane is adsorbed and removed to non-detectable levels. The elimination of separate non-regenerable media is a major benefit.

Carbon Dioxide Removal

The bulk of the impurity in digesters is carbon dioxide and the Guild system removes the CO₂ to pipeline requirements of 1 to 2%. The product CO₂ level is site specific but any range can be met (for example in LNG applications the technology removes CO₂ to less than 50 ppm).

Flow rates handled to date range from 75 SCFM to 12,000 SCFM. System turndown is to 20% of the feed rate (or less) and units can be designed for easy and economical expansion.

About Guild Associates

Guild provides adsorption and catalyst systems to a variety of markets, as well as shop fabricated engineered systems. Guild Associates is the licensee of the Molecular GateTM technology originally developed by Engelhard Corporation (now a part of the BASF Group) and has provided all systems to date.

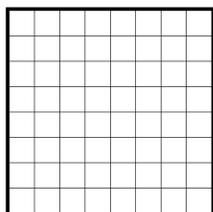
Contact

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You can also visit us on the Internet at www.moleculargate.com.

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