

Guild Associates, Inc.

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Molecular GateTM Systems

**Product
brochure**

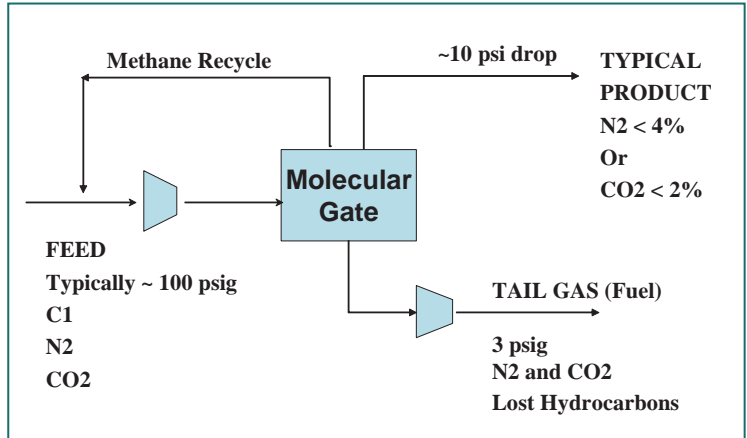
**Nitrogen
Rejection and
Carbon Dioxide
Removal Made
Easy**



Unique approach to natural gas processing

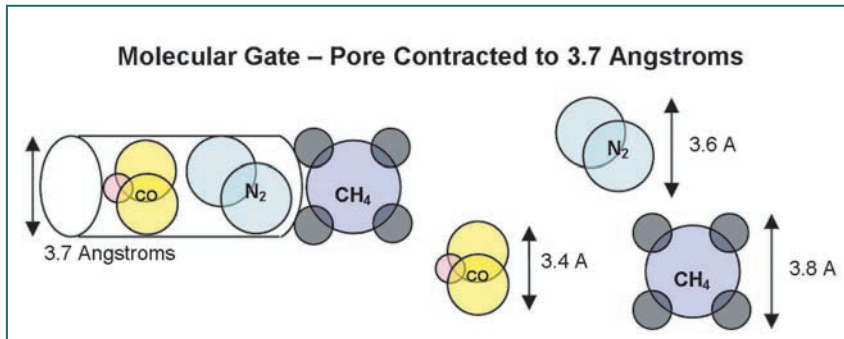
Since its commercialization in 2001, the Kirkpatrick Honor Award winning Molecular Gate™ systems have achieved growing success with over two dozen projects underway. The systems are noted for ease of operation, ability to produce pipeline quality sales gas regardless of the feed composition and minimal pre-treatment requirements.

Typically the system contains 3 or 4 vessels filled with adsorbent. Contaminated feed flows upward while the adsorbent traps and removes the nitrogen (N₂) and carbon dioxide (CO₂) with sales quality natural gas produced from the top of the vessel. A small recycle stream is sent back to the feed to improve the methane recovery to typically over 90%. When saturated with N₂ and/or CO₂, the adsorbent is regenerated by pulling a vacuum and applying a small methane purge.



Enabling precise separations

Featuring patented molecular sieve technology, Molecular Gate® adsorbents offer the capability to adjust pore size. During the manufacturing process, the pore size is set so that N₂ and CO₂ are removed from the contaminated feed stream. Methane cannot enter the pore and flows through the fixed bed of adsorbent as sales gas at feed pressure and this preservation of pressure is a major advantage of the process. The range of possible separations enabled by the ability to tailor the pore size of the Molecular Gate® adsorbent is substantial.



Proven N₂ and CO₂ removal field experience

Molecular Gate systems have been applied to remove N₂ and CO₂ from natural gas and gases produced before and after coal mining. The units operate unattended and remove either CO₂ alone, or a combination of CO₂ and N₂, in a single step. Since 2003, the unit pictured on the right has operated to upgrade a mixture of contaminated natural gas plus coal mine methane with 12% N₂ and 10% CO₂ to a sales gas of 4% N₂ and less than 50 ppm CO₂.

Market interest continues to grow as does the range of applications. To date, feeds as high as 40% N₂ and 38% CO₂, have been upgraded to pipeline requirements. The range of feed stream flow rates also continues to expand with smaller flows treated in several SPEC plants and with larger systems processing flows of up to 10 MM SCFD. Reliability has been excellent and continually improved with the evolution of the design.



SPEC plant option

Since contaminated wells can rarely operate for extended periods without meeting pipeline specifications, a standard plant design is offered to treat a nominal 0.5 MM SCFD for N₂ rejection or over 1 MM SCFD for CO₂ removal.

The 'spec plant' option is available for purchase or rent and can allow for the determination of decline curves and production rates from representative wells prior to a larger drilling program. Easily installed, the system can be relocated, as needed.



Reliable design, service & operating features

Molecular Gate® adsorbent based systems are licensed to Guild Associates by Engelhard Corporation. Guild has worked closely with Engelhard (now part of the BASF Group) during the decade-long development period and is the designer and fabricator of the two dozen systems to date. The systems are designed using all carbon steel construction and operate at ambient temperatures and relatively low pressures. The overall system and switching valves have proven to be extremely reliable with only a daily visit by the operator to monitor operation.

Guild also provides associated compression and installation services. Molecular Gate based systems are offered for sale or in exchange for a share in the project proceeds.



Ready to meet your processing needs

In applications for N₂ rejection and CO₂ removal, Molecular Gate systems offer a new route for meeting the gas treating needs of the natural gas industry.

With successful field operation and proven market acceptance, it is likely that we are treating a stream similar to yours. If you would like an evaluation of how a Molecular Gate system can solve your gas treatment needs, simply complete and fax back the form on the last page of this brochure.

You can also contact Michael Mitriten at 908-752-6420 or info@moleculargate.com, or go on the Internet at www.moleculargate.com to learn more.

Estimate Request

Guild Associates, Inc. would be pleased to provide a performance and cost estimate for your process conditions. To obtain a budgetary quotation, please complete the information below and return via fax, email or post to:

Michael J. Mitariten Phone: 908-752-6420
 Business Manager Fax: 614-798-1972
 Guild Associates, Inc. Email: info@moleculargate.com
 5750 Shier-Rings Road Website: www.moleculargate.com
 Dublin, OH 43016 USA

Name _____ Company _____
 Address _____
 City _____ State _____ Zip Code _____ Country _____
 Phone _____ Fax _____ Email _____
 Well Location _____

Feed Conditions

Feed pressure at wellhead _____
 Feed pressure available _____
 Feed temperature _____
 Feed flow rate _____

Feed Compositions, Vol. %

Methane _____
 Ethane _____
 Propane _____
 Butane _____
 C5+ _____
 Nitrogen _____
 Helium _____
 Carbon dioxide _____
 Hydrogen sulfide _____
 Other _____

Feed Source (check all that apply)

_____ Wet wellhead gas
 _____ Dehydrated wellhead gas
 _____ Gas downstream of NGL recovery
 _____ Coal seam gas
 _____ Exploratory well / field development
 _____ Shut-in well
 _____ Producing well
 _____ Gas compressed at wellhead

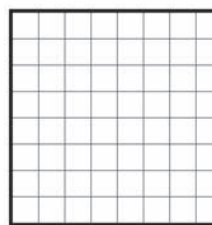
Pipeline Requirements

Pressure _____
 Typical permitted inerts, % _____
 Maximum inerts permitted, % _____
 Is power available? Yes No
 Local use for low BTU Yes No
 If yes, quantity MM BTU / hr _____
 Minimum BTU / ft³ required _____

Comments

Guild is a licensee of Molecular Gate® adsorbent related technology and Guild is solely responsible for all representations regarding the technology made herein.

Molecular Gate is a registered trademark of Engelhard Corporation (a BASF Group company).



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