

TEG Biogas Drying



TEG Biogas Drying at Groot Zevent Vergisting

Product Definition

Biogas usually contains a large amount of water and is typically water-saturated. This water causes several problems for downstream processes and equipment, such as corrosion or freezing in pipelines at relatively high temperatures.

Product Description

Our mission is to develop innovative technologies and we see it as our responsibility to offer sustainable solutions for energy production to clients all over the world. Removing water vapor from gas is an integral part of our gas upgrading roots. The drying of upgraded biogas prior pipeline injection or direct use is a natural extension of these roots.

Frames has developed a complete range of glycol-based dehydration solutions to handle the most demanding conditions. For biogas installations our team of engineering experts will design, build, and commission a complete drying solution to meet the gas demands of the downstream processes. Our glycol-based dehydration technology is capable of drying green gas or bio-methane below a typical dew point of -30°C at 8 bar gas injection pressure, assuring full compliance

with most existing regulations for gas injection of bio-methane in local natural grids. In addition, wet biogas has corrosive properties and by efficient deep drying of upgraded biogas downstream processes like CHP and boilers are protected from corrosion in addition to damage caused by ice crystals being formed in pipelines at freezing condition in case biogas is not properly dried.

Continuous glycol gas drying process

Frames Glycol-based Gas Dehydration Systems use liquid desiccant technology to efficiently remove water from biogas and carbon dioxide. Building on more than 30 years of industry experience, our engineers are able to specify the best glycol system to fit your requirements and optimize field performance. The glycol gas drying is a continuous process making it superior in performance and more compact than batch-wise operated solid bed dryers at biogas flow rates above 1000 m³/h raw input.

Minimized energy and glycol consumption

Our glycol-based dehydration systems include efficient, energy-saving technology such as plate and shell & tube heat exchangers. Moreover, a smart reflux section and the use of high capacity packing ensures very compact equipment and virtually no glycol losses. Our biogas glycol dryers are electrically heated ensuring quick control, efficient use of energy, compact design, and ease of maintenance. Electrically controlled careful management of the reboiler heater bundle skin temperature prevents unwanted glycol degradation. This design feature eliminates the need to use chemicals to control fluctuations in system pH associated with the degradation of glycol.

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Process Description

The Frames Glycol-based Dehydration Unit mixes lean, water-free glycol with wet biogas in the top of an absorber (glycol contactor), to dry the gas by physical absorption. This drying process occurs on the surface of structured packing, towards the bottom of the column. The dry biogas then leaves the top of the contactor column ready for use. The wet glycol, often referred to as "rich glycol", is drawn off from the bottom. From the contactor, the rich glycol is routed to the regeneration package for purification. Here it is first preheated using heat from the reflux condenser at the top of the reboiler's still column, along with heat from the lean/rich heat exchanger. The heated rich glycol is then fed into the stripper (also known as a regenerator) which consists of a still column, an overhead condenser, and a reboiler. Here the glycol is thermally regenerated to remove excess water and to regain the high glycol purity. To optimize energy use, the hot clean and lean glycol is used to preheat the incoming rich glycol in the heat exchanger, before being pumped up to operating pressure and cooled ready for reuse in the contactor.



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TEG Biogas Drying at HVC Middenmeer

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Project Management

Good project management is like running a busy family – directing and coordinating all efforts in order to optimize the result of the team.

At Frames, we work as a coordinated team that focuses on integrated solutions. Our multidisciplinary teams ensure smooth integration of own Frames technology unit operations and technologies provided by partners or subcontractors into a total biogas processing solution. The combination of our project management system and the skills of our project managers ensures that we deliver the equipment for each project on time, while paying particular attention to health, safety, environment and quality requirements for both the client and Frames.

Thanks to a network of international partners and a worldwide supply chain, our clients benefit from smart services provided by a strong, global project management company.

Technical Details

- **Efficient system for removing water from wet biogas and CO₂**
- **Protection of downstream processes against corrosion and clogging**
- **Low energy design with efficient heat exchangers**
- **Electric heating and full electric control**
- **Low degradation and no need for chemical pH control**

Added Value Frames

- **Applicable to customer requirements in various markets**
- **Skid-mounted units that easily integrate into your production system**
- **Low energy demands with optimized heat integration technology and low emission systems**
- **Robust and reliable units designed with lean engineering methods, using high-end materials**

References

- **HVC Middenmeer – The Netherlands**
- **Groot Zevert Vergisting –The Netherlands**

Contact

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Frames Family Tree

Onshore

Offshore

Floaters

Renewable Energy



Oil & Water



Gas



Flow Control & Safeguarding



Turn-key Biogas Installations

- Green Gas Installations (GGI)
- Combined Heat and Power (CHP)
- Compressed bio-methane (CBM)
- Liquefied bio-methane (LBM)

Biogas and Bio-synthesis Gas Upgrading (CO₂, H₂S, VOC, NH₃ & H₂O)

- Hybrisol®
- Laminol®
- Ammonia Scrubber
- Hydrogen separation

Bio-methane Grid Injection

- Metering
- Odorizing
- N₂-injection
- LPG-addition

Turn-key CO₂ Installations

- Bio-CO₂ for horticulture
- Industrial capture and application of CO₂
- Carbon Capture and Storage (CCS)

Flue gas CO₂ capture

- Galloxol®
- Liquefied CO₂

Multiphase Separation

- Production Separators (High & Low Pressure)
- Test Separator
- Degasser & Knock-Out Drum
- Water Oil Separator (WOSEP)

Compact Inline Separation

- SwirlSep

Electrostatic Coalescers

- Dehydrator
- Desalter

Produced Water Treatment

- Deoiling & Desanding Hydrocyclones
- Gas Flotation
- Media Filtration
- Solids Removal & Cleaning
- Stripping

Separation Internals

Heat Exchangers

Gas Separation

- Demisting
- Scrubbers
- Filters
- SwirlSep

Heat Exchangers

- Shell & Tube Heat Exchangers

Air-Cooled Coolers

Gas Sweetening (H₂S & CO₂)

- Amines
- Thiopaq O&G
- Solid Bed Scavenger
- Membrane
- Molecular Sieve

Gas Dehydration

- Glycol (TEG)
- Molecular Sieve

Dew Point Control

- Low Temperature Separation (LTS)
- Solid Desiccant

Hydrate Inhibition

- MEG/DEG Recovery
- Methanol Recovery
- MEG/DEG Desalination

Light Hydrocarbon Recovery

- Condensate Stabilization
- Fractionation

Fuel Gas Treatment

Hydraulic Systems

- Wellhead Control
- Subsea Hydraulic Power Units
- Hydraulic Power Units
- IWOC (Intervention Workover Control Systems)
- TUTU (Topside Umbilical Termination Unit)
- Cargo Ballasting Systems

Safety Instrumented Systems

- High Integrity Protection Systems (HIPS)

Chemical Injection

- Chemical & Methanol Injection Systems
- Chemical Distribution Systems
- Seawater Electrochlorination Systems

Valve Automation Center

- Actuators and Actuated Valve Packages
- Control Systems

Automation

- Buoy Telemetry
- Tank Farm Control & Safeguarding

Wellsite Packages

Services



Asset Life Cycle Management

Maintenance & Field Services

Commissioning & Start-up

Spare Parts

Operator Training

Engineering Studies

- Conceptual
- FEED and Basic

Integrated Solutions

