

Application Note

HYGROPHIL F 5673

Process Trace Moisture Analyzer for
Moisture Measurement in Lift Gas



APPLICATION NOTE

Minimize the risk of hydrate formation with an reliable process trace moisture analyzer.

The gas lift is one of the most economical oilfield practice for enhancing oil recovery.

Gas is pumped into the rising pipe to lift the well fluids. The untreated gas used for the gas lift is usually the associated gas from the well and it is often saturated with water which is a critical component in this process. The injected gas reduces the density of the fluid in the tubing and the bubbles have a scrubbing effect to the liquids.

The gas has to be dehydrated to prevent formation of hydrates that will impede flow.

After the oil and gas treatment where the gas is separated from the oil, the gas is processed and dehydrated.

Usually glycol dehydration units are used to treat the gas in the natural gas purification section.

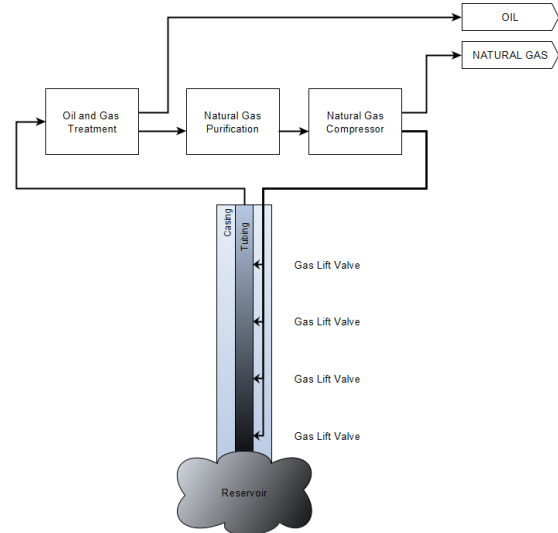


Figure 1: Schematic of a Lift Gas Unit

An adequate dehydration process will effectively prevent hydrate formation and reduces corrosion caused by the condensed water.

Corrosion risk must be mitigated and reduced to a minimal level for any gas streams containing CO₂ or H₂S. These gases are acidic, and when combined with condensed water, can lead to corrosion of the process facilities.

The gas is then compressed and sent back to the casing where it is injected at different levels.

Typical Process Conditions:

Composition:	Natural gas from oil field
Temperature:	30 to 50 °C 86 to 122 °F
Pressure:	3 to 7 MPa _g 435 to 1015 psig up to 20 MPa _g (2900 psig) after compression stage
Moisture: (dew point)	DT: -10 °C to -30 °C DT: 14 °F to -22 °F

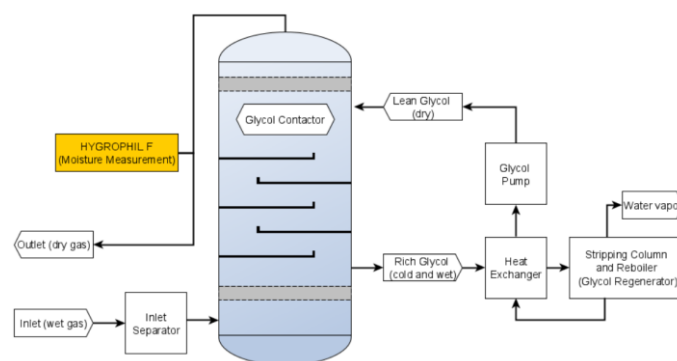


Figure 2: Schematic of a Glycol Dehydration Unit

The BARTEC BENKE **Hygrophil F** is a multi channel trace moisture analyzer with a extremely robust but accurate moisture sensor. Its low maintenance requirements makes this unit ideal for offshore installation where frequent checks or recalibration of the moisture sensors are not feasible.

Inline or at-line installations are possible with sensor retraction armature or sample conditioning systems.

APPLICATION NOTE

The HYGROPHIL F is designed for the needs of the oil, gas and chemical industry.

The core element of the moisture sensor is an optical thin film element made of silicon dioxide and zirconium dioxide. The microporous stack of alternating high and low refracting optical layers is forming a Fabry-Pérot Interferometer with a distinctive and reliably detectable reflection minimum in the spectral range around 820 nm.

Selective to water, molecules can diffuse into the porous Fabry-Pérot element, which then performs a shift of the reflection minimum in proportion to the actual water vapour pressure. The spectral shift is detected and evaluated with a compact high-resolution polychromator, which is located in the evaluation unit together with the light emitting diode. The interconnecting fiber optic cable can be up to 800 m long because of the detection of an optical minimum instead of an intensity change.

The evaluation unit processes and calculates the present dew point temperature as well as other units such as water vapour pressure, parts per million, mg/m³ and further more. Several analog outputs, MODBUS, PROFIBUS RTU and via TCP/IP as well as relay contacts are equipped as standard for interconnection to the control system.

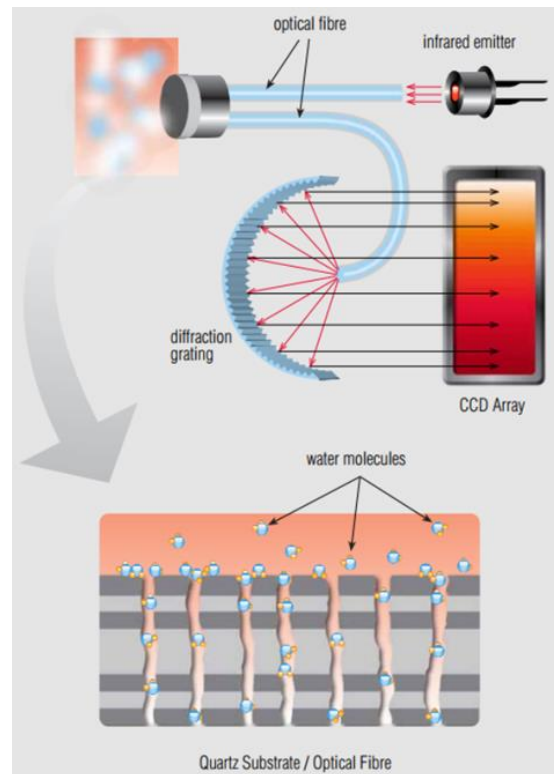


Figure 3: Schematic of the Measurement Principle

Thousands of installations worldwide prove the advantages of this measurement principle:

- Robust sensor construction for outstanding long-term stability
- Sensor validation at process conditions by accredited and independent laboratory on request
- Easy sensor cleaning and almost no maintenance required
- In-line installation with sensor retraction armature possible (fast response and emission-free)
- Flexible on-line solutions with customized sample conditioning systems
- Certified for safe operation in hazardous area (ATEX, IECEx, CSA, TR CU)