Application Note
Water measurement in propane

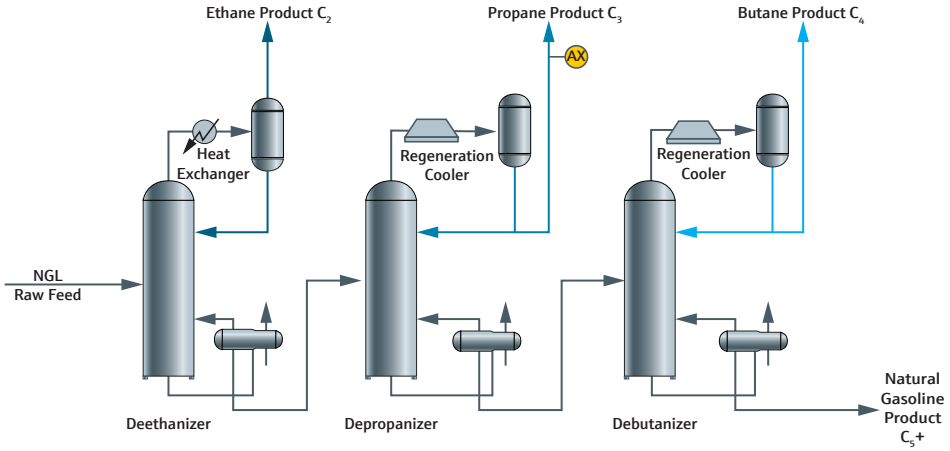
Industry:
Natural Gas Processing
Application Note 35301

Key Points

- Fast response to H_2O concentration changes
- Patented* Differential Spectroscopy technique measures H_2O at low ppm levels in propane
- Integrated permeation tube supports automated validation checks
- Laser-based measurement is highly selective and accurate for H_2O in propane

*www.spectrasensors.com/patents

Fractionation and recovery of NGLs Natural gas from some geological formations contains natural gas liquids (NGLs); ethane, propane, butane and a mix of C_5+ liquid condensates. These NGL compounds are commercially valuable as feedstocks for production of petrochemicals, octane-boosting gasoline additives, and for use as fuels. Cryogenic processing is used to separate and recover NGLs from natural gas using a series of fractionation columns.



NGL Fractionation Process

Measurement of H_2O to meet purity specifications The purity specifications for propane and other NGL fractionation products are based on their intended use and downstream processing. Contaminants including H_2O, CO_2, and H_2S are measured in NGL fractionation products to ensure purity specifications are met and documented as required in tariff and sales agreements between suppliers, carriers and end users. Specifications and contracts typically state that an NGL fractionation product shall not contain free or entrained water.

SpectraSensors' solution SpectraSensors tunable diode laser absorption spectroscopy (TDLAS) analyzers have proven highly effective for this important measurement. TDLAS analyzers have an exceptionally fast response to changes in H_2O concentration, an important performance characteristic for monitoring H_2O in the outlet of a depropanizer and at downstream custody transfer points. SpectraSensors patented differential spectroscopy technique enables detection and measurement of low ppm levels of H_2O in propane. An integrated permeation tube supports automated validation checks to verify the analyzers is operating properly during the extended periods of time when H_2O is not present in the depropanizer outlet or downstream distribution system. Laser and detector components are isolated and protected from process gas and contaminants avoiding fouling and corrosion and ensuring stable long-term operation and accurate measurements in the field.

SpectraSensors®
An Endress+Hauser Company

Application Data	
Target Components	H_2O in Propane
Typical Measurement Ranges	0-10 ppm*
Typical Repeatability	±0.5 ppm or 2% of reading**
Measurement Response Time	1 to ~60 seconds
Principle of Measurement	Differential Tunable Diode Laser Absorption Spectroscopy (H_2O dryer included)
Validation	Integrated Permeation System

* Consult factory for alternate ranges.

** Repeatability is based on a single stream composition with minimal variation and which falls within the table below. If the stream composition varies, the factory should be consulted for specification.

Typical Background Stream Composition

Component	Minimum (Mol%)	Typical (Mol%)	Maximum (Mol%)
Methane (C_1)	0	0	1
Ethane (C_2)	0	1	2
Propane (C_3)	90	97	100
C_4+	0	2	8
Carbon Dioxide (CO_2)	0	100 ppm	200 ppm
Hydrogen Sulfide (H_2S)	0	10 ppm	100 ppm

The background stream composition must be specified for proper calibration and measurement performance. Specify the typical composition, along with the minimum and maximum expected values for each component, especially H_2O, the measured component. Other stream compositions may be allowable with approval from SpectraSensors.

www.spectrasensors.com/contact