

Application Note

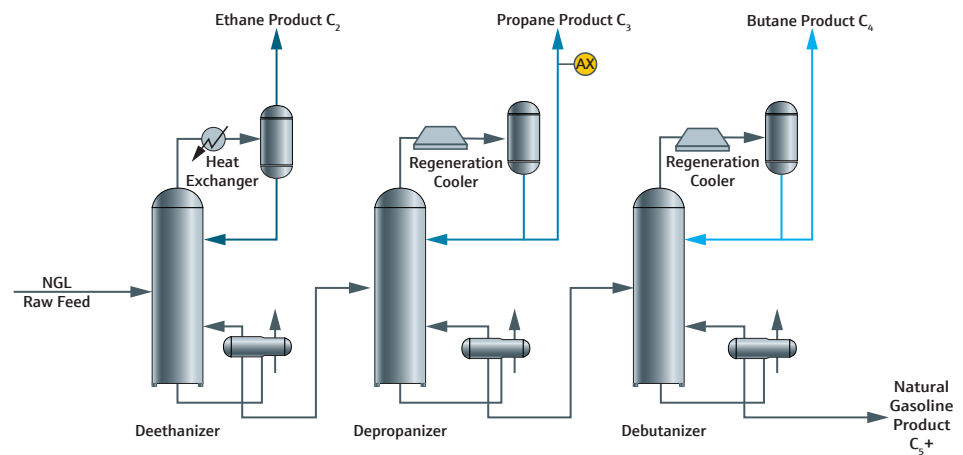
Hydrogen sulfide measurement in propane

Industry:
Natural Gas Processing
Application Note 35302

Key Points

- Fast response to H₂S concentration changes
- Patented* Differential Spectroscopy technique measures H₂S at low ppm levels in propane
- Low maintenance and OPEX costs – no cylinders of carrier and combustion gases or lead acetate tape
- Laser-based measurement is highly selective and accurate for H₂S in propane

Fractionation and recovery of NGLs Natural gas from some geological formations contains natural gas liquids (NGLs); ethane, propane, butane and a mix of C₅+ 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 H₂S 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 H₂S, CO₂, and H₂O 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.

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 H₂S concentration, an important performance characteristic for monitoring H₂S 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 H₂S in propane. 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.

*www.spectrasensors.com/patents

Application Data

Target Components	H ₂ S in Propane
Typical Measurement Ranges	0-20 ppm*
Typical Repeatability	±1 ppm**
Measurement Response Time	1 to ~60 seconds*
Principle of Measurement	Differential Tunable Diode Laser Absorption Spectroscopy (H ₂ S scrubber included)
Validation	Certified blend of H ₂ S in Nitrogen

* 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 ₂ S)	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 H₂S, the measured component. Other stream compositions may be allowable with approval from SpectraSensors.

Contact

4333 W. Sam Houston Pkwy N.
Suite 100
Houston, TX 77043

Tel +1 713 300 2700
+1 800 619 2861
Fax +1 713 856 6623

sales@spectrasensors.com
service@spectrasensors.com
www.spectrasensors.com

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