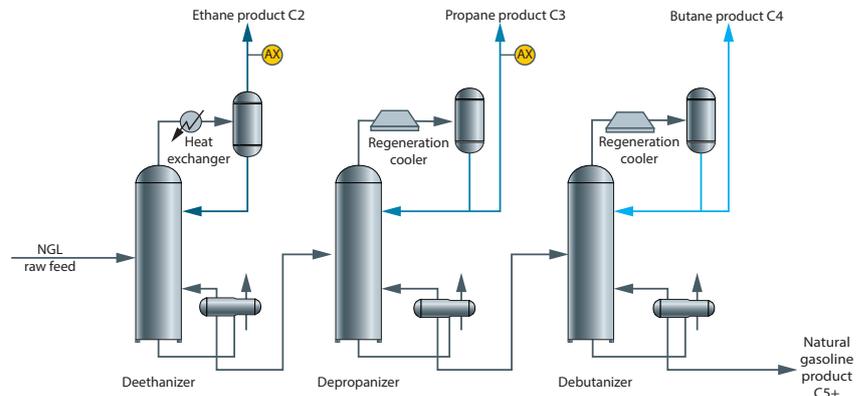


Natural gas processing: H₂S in ethane/propane mix NGL

Benefits at a glance

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



NGL fractionation process

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. Ethane and propane are sometimes mixed to form an 80/20 hydrocarbon blend termed E/P mix which is used as a feedstock for ethylene plants.

Measurement of H₂S to meet purity specifications

The purity specifications for E/P mix and other NGL fractionation products are based upon their intended use and downstream processing. Contaminants including H₂S, H₂O, and CO₂ are measured in E/P mix 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 require that H₂S in E/P mix not exceed low ppm levels.

Endress+Hauser's solution

Tunable diode laser absorption spectroscopy (TDLAS) is a SpectraSensors technology 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 an NGL fractionation plant and at downstream custody transfer points. Endress+Hauser's patented differential spectroscopy technique enables detection and measurement of low ppm levels of H₂S in E/P mix. Laser and detector components are isolated and protected from process gas and entrained contaminants avoiding fouling and corrosion, and ensuring stable long-term operation and accurate measurements.

Application data

Target component (Analyte)	H ₂ S in ethane/propane mix
Typical measurement range	0-20 ppmv*
Typical repeatability	±1 ppmv**
Measurement response time	1 to ~60 seconds
Principle of measurement	Differential tunable diode laser absorption spectroscopy (TDLAS) (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 (C1)	0	0.5	25
Ethane (C2)	70	85	90
Propane (C3)	0	15	30
Butanes and heavier (C4+)	0	0	3
Water (H ₂ O)	0	100 ppmv	250 ppmv
Carbon dioxide (CO ₂)	0	100 ppmv	500 ppmv

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 Endress+Hauser.