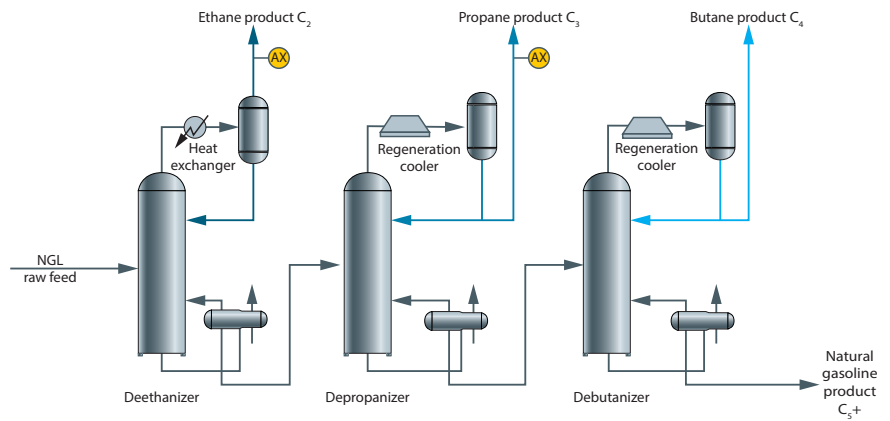


Natural gas processing: CO₂ in ethane/propane mix NGL fractionation

Benefits at a glance

- Fast response to CO₂ concentration changes
- Laser-based measurement is highly selective and accurate for CO₂ in ethane/propane mix
- Non-contact laser measurement avoids fouling and corrosion for reliable long-term operation
- Low maintenance and OPEX costs – no cylinders of carrier gases or other consumables



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 CO₂ 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 CO₂, H₂O, and H₂S 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 CO₂ in E/P mix not exceed 1,000 ppmv.

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 CO₂ concentration, an important performance characteristic for monitoring CO₂ levels in an NGL fractionation plant and at downstream custody transfer points. 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)	CO ₂ in ethane/propane mix
Typical measurement ranges	0-100 ppmv*
Typical repeatability	±2 ppmv**
Measurement response time	1 to ~60 seconds
Principle of measurement	Tunable diode laser absorption spectroscopy (TDLAS)
Validation	Certified blend of CO ₂ 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	20 ppmv	250 ppmv
Hydrogen sulfide (H ₂ S)	0	10 ppmv	1

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, and the measured component. Other stream compositions may be allowable with approval from Endress+Hauser.