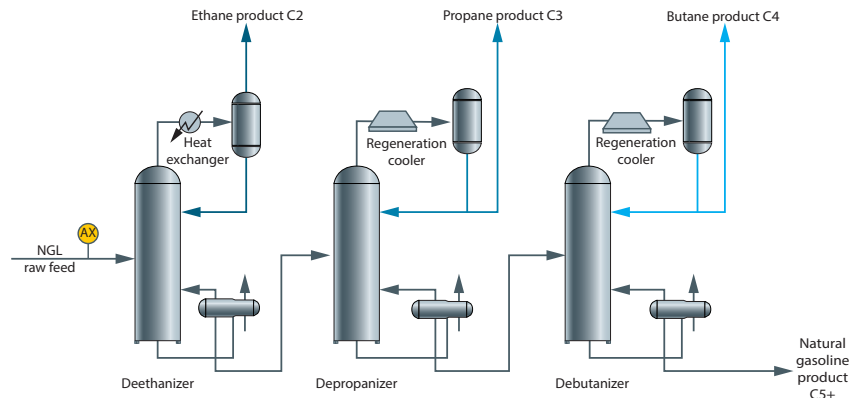


Natural gas processing: H₂S in Y-grade NGL fractionation

Benefits at a glance

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



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. Once methane in the raw natural gas is separated in a Demethanizer the remaining NGLs can be recovered using a cryogenic turbo expander yielding a mixed Y-grade stream. The Y-grade mixture can be fed to a fractionation unit to separate and recover individual NGL products.

Measurement of H₂S to meet specifications

Y-grade and NGL product streams have an H₂S specification set by customers or pipelines based on the intended use and downstream processing. Contaminants including H₂O, CO₂, and H₂S are measured in Y-grade and NGL fractionation products to ensure specifications are met and documented as required

in tariff and sales agreements between suppliers, carriers and end users. Specifications and contracts typically state that Y-grade and NGL fractionation products shall not contain free or entrained water.

Endress+Hauser's solution

Tunable diode laser absorption spectroscopy (TDLAS) is a SpectraSensors technology proven effective for monitoring H₂S in Y-grade feed to NGL fractionation units. TDLAS analyzers have an exceptionally fast response to changes in H₂S concentration, an important performance characteristic for measuring H₂S in Y-grade feed entering a fractionation unit, or at custody transfer points. Laser and detector components are isolated and protected from process gas and contaminants avoiding fouling and corrosion and ensuring stable long-term operation and measurements in the field.

Application data

Target component (Analyte)	H ₂ S in Y-grade NGL fractionation feed
Typical measurement range	0-20 ppmv*
Typical repeatability	±1 ppmv**
Measurement response time	1 to ~60 seconds
Principle of measurement	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	1	1.5
Ethane (C2)	35	45	55
Propane (C3)	30	36	45
Butane (C4)	0	12	20
Pentanes and heavier (C5+)	0	5	6
Carbon dioxide (CO ₂)	0	100 ppmv	250 ppmv
Hydrogen sulfide (H ₂ S)	0	10 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.