

## Application Note

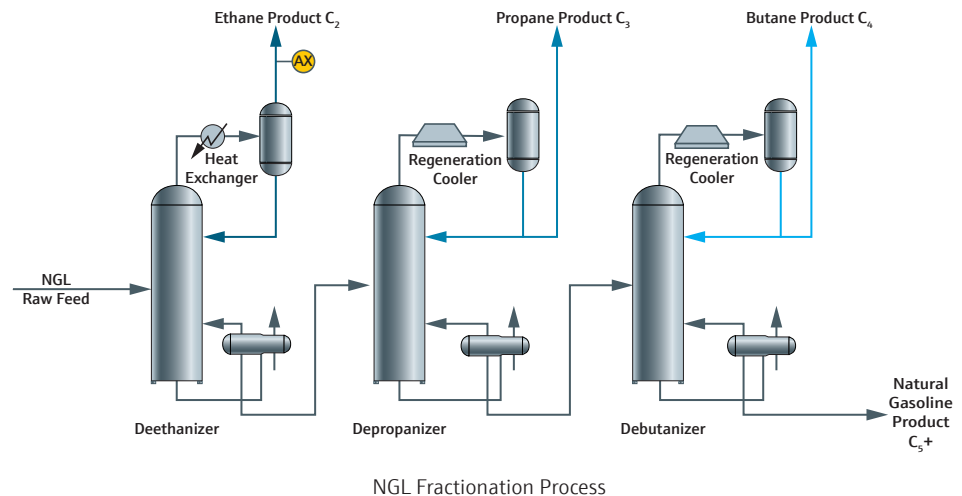
# Carbon dioxide measurement in ethane

**Industry:**  
Natural Gas Processing  
Application Note 35103

### Key Points

- Fast response to CO<sub>2</sub> concentration changes
- Laser-based measurement is highly selective and accurate for CO<sub>2</sub> in ethane
- Non-contact laser measurement avoids fouling and corrosion for reliable long-term operation
- Low maintenance and OPEX costs – no carrier gases or consumable items

**Fractionation and recovery of NGLs** Natural gas from some geological formations contains natural gas liquids (NGLs); ethane, propane, butane and a mix of C<sub>5</sub>+ 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.



**Measurement of CO<sub>2</sub> to meet purity specifications** The purity specifications for ethane and other NGL fractionation products are based on their intended use and downstream processing. Contaminants including H<sub>2</sub>O, CO<sub>2</sub>, and H<sub>2</sub>S 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 CO<sub>2</sub> concentration, an important performance characteristic for monitoring CO<sub>2</sub> in the outlet of a deethanizer and at downstream 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 accurate measurements in the field.

### Application Data

Target Component (Analyte)	CO <sub>2</sub> in Ethane
Typical Measurement Range	0-100 ppm*
Typical Repeatability	±2 ppm
Measurement Response Time	1 to ~60 seconds
Principle of Measurement	Tunable Diode Laser Absorption Spectroscopy
Validation	Certified blend of CO <sub>2</sub> in Nitrogen

\*Consult factory for alternate ranges.

### Typical Background Stream Composition

Component	Minimum (%)	Typical (%)	Maximum (%)
Methane (C <sub>1</sub> )	0	1	5
Ethane (C <sub>2</sub> )	95	98	100
Propane (C <sub>3</sub> )	0	1	3
C <sub>4</sub> <sup>+</sup>	0	0	1
Water (H <sub>2</sub> O)	0	20 ppm	250 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0	10 ppm	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, especially CO<sub>2</sub>, and the measured component. Other stream compositions may be allowable with approval from SpectraSensors.

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