

# Ensure high-quality Ethylene production and purity with Quantum Cascade Laser Analyzers

## Background

Ethylene, one of the most valuable and in-demand olefins today, has stringent purity requirements that must be verified during production and at the point of custody transfer. Impurities can affect the downstream production of polymers by poisoning catalyst. To ensure high-quality ethylene production and purity, operators require ultrafast and precise detection and analysis of the concentrations of water, acetylene, and ammonia molecules during the manufacturing process.

## What's your challenge?

The presence of impurities can poison or oxidize expensive catalysts, form carbamates or carbonates that clog gas lines, and can often lead to costly repairs and downtime.

## What's your opportunity?

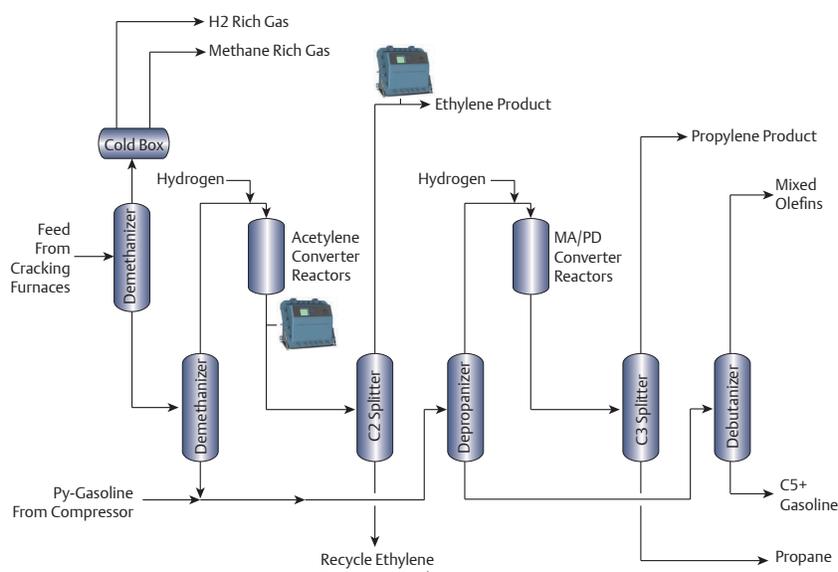
Precision detection of gas impurities is critical, regardless of how challenging an application. Rosemount QCL/TDL technology can measure with ultrafast speed and down to sub ppm concentrations.

## QCL Benefits for Ethylene Production and Purity

Rosemount Quantum Cascade Lasers deliver fast, reliable gas analysis that monitor the presence of contaminants, including acetylene, CO, CO<sub>2</sub>, and moisture, to ensure the integrity of the ethylene process stream.

- Real-time monitoring helps avoid production upsets, process damage, and downtime
- High specificity and speed-of-response accurately identify the presence of acetylene
- Patented laser chirp technique and sub-ppm analysis detect the full range of ethylene impurities
- Thousands of scans every second calculate component measurement and ensures ethylene feedstock meet specifications
- No consumables, no calibration, and no in-field enclosure or shelters reduce installation cost
- Internal, solid-state, and modular design has no moving parts minimizing maintenance and simplifying upgrades
- Easy-to-use instrumentation and fast technician training

Figure 1 – Typical Ethylene Production Process



## Recommended Technology

### Rosemount™ CT5800 Continuous Gas Analyzer

A unique cell design enables the CT5800 to deliver highly accurate measurement of very low concentrations of impurities in gas streams. The device can have up to six Quantum Cascade Lasers to measure multiple components simultaneously in a single analyzer. In addition to ethylene applications, it is also ideal for nitrogen and hydrogen purity applications. The CT5800 is designed for hazardous areas with a flameproof enclosure.



Table 1 – Typical Measurement Ranges

Component	Measurement Range		
	Range	LOD	Repeatability*
H <sub>2</sub> O	0–1 ppm	0.1	±1 %
CO <sub>2</sub>	0–1 ppm	0.05	±1 %
CO	0–1 ppm	0.05	±1 %
C <sub>2</sub> H <sub>2</sub>	0–10 ppm	0.2	±1 %
CH <sub>3</sub> OH	0–100 ppm	1.0	±1 %
NH <sub>3</sub>	0–10 ppm	0.2	±1 %
CH <sub>4</sub>	0–100 ppm	0.5	±1 %

\*Repeatability is ±1 % of reading or the Limit of Detection (LOD), whichever is greater.

## Features & Benefits

### Multi-component QCL analyzer

- Measure up to 12 components simultaneously
- Accurate and sensitive gas measurements
- Excellent linearity of response and repeatability
- Auto validates analyzer performance to insure control performance without field maintenance intervention
- Low maintenance and low lifetime costs
- Continuous health diagnostic reporting
- Embedded ARM processor for fully autonomous operation
- Intuitive, simple front panel user interface allows access to all instrument functions

### Field serviceable and field configurable

- Interchangeable modular configuration for up to six lasers

## EmersonProcess.com/GasAnalysis

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