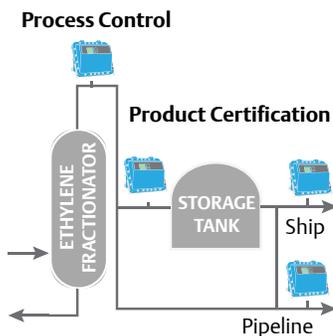


# Best in Class Control of your Ethylene Fractionator and Real Time Product Certification

Did you know that Rosemount QCL/TDL technology provides multicomponent analyses with a wide dynamic range in a single unit?

## What if you could...

- Have fast analysis times, and high sensitivities to optimize process control of your fractionator tower?
- Carry out online certification of ethylene product purity in a single analyzer?
- Lower the total life cycle cost associated with maintaining your system?



Ethylene is one of the most important organic compounds made in the world today. It is a building block chemical needed to manufacture many commercial products and is estimated to reach a global manufacturing capacity of 200 million tons by 2020. Approximately half of the world demand for ethylene is for the manufacture of polyethylene but it is also used to make vinyl chloride, ethylbenzene and many other valuable intermediate products such as ethylene oxide and ethanol.

## HIGH PURITY ETHYLENE ANALYSIS FOR CONTROL AND CERTIFICATION

The goal of an ethylene plant is to produce 99.99% pure product. The final purification step is made in an ethylene fractionation tower, or splitter. Analysis is required for process control of the fractionator in order to ensure on-spec production. Once the ethylene product leaves the splitter, its purity must be certified before distribution by pipelines or ships.

## ETHYLENE FRACTIONATOR OVERHEAD

Ethane and ethylene have similar physical properties making them difficult to separate. Process control of product purity requires a fine balance to maintain ethane close to the specification limit without going off spec or recycling ethylene. Operating the tower efficiently offers considerable economic advantages in reducing product give-away, minimizing energy usage and avoiding ethylene recycle. Measuring the C1 and C2 molecules, as well as CO and CO<sub>2</sub> allows the tower operation to be fine-tuned for maximum efficiency and ensures that ethylene production is on-spec.

Measurement Range in Ethylene				
	Components	Range <sup>1</sup>	LOD <sup>2</sup>	UOM
Process Control	Methane	0 - 1000	5	ppmv
	Acetylene	0 - 20	0.2	ppmv
	Ethane	0 - 500	5	ppmv
	CO	0 - 5	0.05	ppmv
	CO <sub>2</sub>	0 - 5	0.05	ppmv
Adders for product certification	Ammonia	0 - 20	0.2	ppmv
	H <sub>2</sub> S	0 - 50	2	ppmv
	Water	0 - 10	0.1	ppmv
	Methanol	0 - 100	1	ppmv

<sup>1</sup> Components and ranges are indicative. Analyzer requirements will depend on complete gas list. Detailed specs will be provided during the ordering process.

<sup>2</sup> Repeatability +/- 1% of reading or the Limit of Detection (LOD), whichever is greater

## ETHYLENE PRODUCT CERTIFICATION

Before export to customers, ethylene product must be analyzed to ensure that it meets specification. Traditionally this has been done using grab samples and laboratory analysis. However, components which previously were not accessible to online analyzers are can now be measured using Emerson's QCL technology. This means that online, real time product certification is now a reality.

## THE EMERSON SOLUTION

### Rosemount™ CT5800 Continuous Gas Analyzer with Integrated Sample Handling

- Measure all your critical acetylene converter components in a single analyzer utilizing multiple QCL/TDL lasers
- Analysis time of approximately 5 seconds ensures timely delivery of critical information for process monitoring and control
- Unmatched sensitivity detects trace impurities at sub ppm concentrations
- Excellent linearity of response and repeatability
- Field mountable eliminating the need for expensive analyzer shelters and minimizes sample transport line
- Flameproof enclosure certified for hazardous areas
- Integrated sample handling ensures the gas sample is representative and delivered timely to the analyzer



### DRAMATICALLY LOWER OPERATIONAL AND MAINTENANCE COSTS

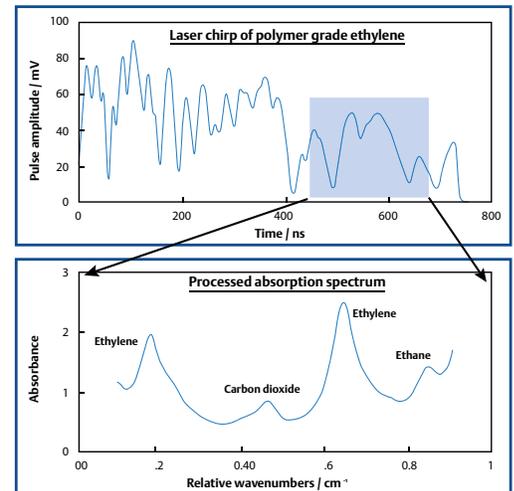
- Real time validation on process samples guarantees performance and minimizes field maintenance intervention
- Inherently stable spectroscopic technique extends calibration intervals to as little as once per year
- Interchangeable modular components for easy field service and configuration
- Remote factory support available, either by direct connection or by secure file exchange

### LASER CHIRP TECHNIQUE – MULTIPLE MEASUREMENTS IN A SINGLE SYSTEM

Quantum Cascade Lasers are semiconductor devices which produce light in the mid-IR region. They are fabricated to emit light at a desired wavelength and are made to scan a spectrum using a laser chirp technique. When a QCL is pulsed with electrical energy to start the laser process, it heats up. As the temperature increases, the wavelength of the emitted light also increases. A laser chirp lasts about one microsecond and in this time a spectrum of between 1-3 wavenumbers is scanned.

The raw detector signal is then processed to convert it into a spectrum from which the concentration of analytes can be calculated. QCLs can be chirped at a frequency of up to 100 KHz, enabling many thousands of spectra to be gathered in a few seconds and processing these spectra gives a strong signal with a good signal to noise ratio.

The wavelength region which is scanned is selected to enable measurement of the desired analytes and it is often possible to detect more than one compound with a single QCL device. An advanced signal processing procedure enables real time validation of measurements and greatly reduces the need for calibrations.



Standard Terms and Conditions of Sale can be found on the [Terms and Conditions of Sale page](#).  
The Emerson logo is a trademark and service mark of Emerson Electric Co.  
Rosemount and Rosemount logotype are trademarks of Emerson.  
All other marks are the property of their respective owners.  
© 2017 Emerson. All rights reserved.

[LinkedIn.com/company/Emerson-Automation-Solutions](https://www.linkedin.com/company/Emerson-Automation-Solutions)  
[Twitter.com/Rosemount\\_News](https://twitter.com/Rosemount_News)  
[Facebook.com/Rosemount](https://www.facebook.com/Rosemount)  
[Youtube.com/user/RosemountMeasurement](https://www.youtube.com/user/RosemountMeasurement)  
[Google.com/+RosemountMeasurement](https://www.google.com/+RosemountMeasurement)

#### North America

**Emerson Automation Solutions**  
10241 West Little York, Suite 200  
Houston, Texas 77040 USA  
 ☎ Toll Free + 866 422 3683  
 ☎ T + 713 396 8880  
 ☎ F + 713 466 8175  
 ✉ QCL.CSC@Emerson.com

#### Europe Regional Office

**Emerson Automation Solutions AG**  
Blegistrasse 21  
CH-6341 Baar-Walterswil  
Switzerland  
 ☎ T + 41 41 768 6111  
 ☎ T + 41 41 761 8740  
 ✉ QCL.CSC@Emerson.com

#### Middle East and Africa Regional Office

**Emerson Automation Solutions**  
Emerson FZE  
Jebel Ali Free Zone  
Dubai, UAE  
P.O.Box 17033  
 ☎ T + 971 4 811 8100  
 ☎ F + 971 4 886 5465  
 ✉ QCL.CSC@Emerson.com

#### Asia Pacific Regional Office

**Emerson Automation Solutions**  
Asia Pacific Private Ltd  
1 Pandan Crescent  
Singapore 0512  
Singapore  
 ☎ T + 65 777 8211  
 ☎ F + 65 777 0947  
 ✉ QCL.CSC@Emerson.com

QCL-ADS-Ethylene-Fractionator-Product-Certification