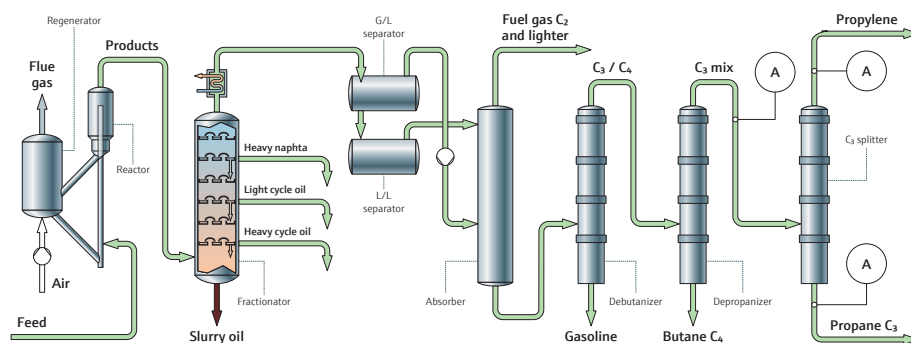


Refining: H₂S in propane/propylene mix

Benefits at a glance

- Fast response to H₂S concentration changes
- Patented differential spectroscopy technique measures H₂S at ppmv levels
- Laser-based measurement is highly selective and accurate for H₂S in C₃ mixtures
- Low maintenance and OPEX costs – no cylinders of carrier or combustion gases, or lead acetate tape



Fractionation and recovery of propane and propylene from an FCCU

FCCU propylene production

Refinery Fluidized Catalytic Cracking Units (FCCU) are a major source of the propylene feedstock used in petrochemical plants. The yield of propylene from an FCCU varies with feedstock and operating conditions. Refineries operate FCCUs to achieve a balance of gasoline and propylene production, maximizing the production of one decreases the yield of the other. The gas plant associated with an FCCU separates fuel gas from C₃ and C₄ gases and gasoline, and contains treatment equipment to remove H₂S and other sulfur compounds from these products.

On-line H₂S monitoring

Sulfur compounds in the feed to an FCCU are converted to H₂S, which tends to partition into the C₃ propane/propylene mix. H₂S must be removed from the C₃ mix to avoid carryover into the separated propane and propylene product streams. On-line monitoring of the H₂S concentration in C₃ mix and the separated propane and propylene product streams ensures purity specifications are met for downstream petrochemical production processes.

Endress+Hauser's solution

Tunable diode laser absorption spectroscopy (TDLAS) is a SpectraSensors technology proven highly effective in this critical measurement. TDLAS analyzers have an exceptionally fast response to changes in H₂S concentration, an important performance characteristic for monitoring and controlling H₂S levels in propane and propylene streams. Endress+Hauser's patented differential spectroscopy technique enables detection and quantitation of low ppmv levels of H₂S in propane/propylene mixtures. Laser and detector components are isolated and protected from the process gas and entrained contaminants avoiding fouling and corrosion, and ensuring stable long-term operation and accurate measurements.

Application data	
Target component (analyte)	H ₂ S in propane/propylene (C ₃) mix
Typical measurement range	0-10 ppmv*
Repeatability for JT33	± 100 ppbv or ± 1% of reading, whichever is greater
Repeatability for SS2100, SS2100i	± 0.5 ppmv**
Measurement response time	1 to ~60 seconds*
Principle of measurement	Differential tunable diode laser absorption spectroscopy (TDLAS) (H ₂ S scrubber included)
Validation	Certified blend of H ₂ S in nitrogen balance

*Consult factory for alternate ranges.

Typical background stream composition			
Background 1 - propane			
Component	Minimum (Mol%)	Typical (Mol%)	Maximum (Mol%)
Ethane (C ₂ H ₆)	0	1	2
Propane (C ₃ H ₈)	65	90	100
Propylene (C ₃ H ₆)	0	8	35
Butanes and heavier (C ₄ +)	0	1	2.5

Background 2 - 35/65 propane/propylene mix			
Component	Minimum (Mol%)	Typical (Mol%)	Maximum (Mol%)
Ethane (C ₂ H ₆)	0	1	2
Propane (C ₃ H ₈)	0	34	50
Propylene (C ₃ H ₆)	50	64	100
Butanes and heavier (C ₄ +)	0	1	2

Background 3 - 65/35 propane/propylene mix			
Component	Minimum (Mol%)	Typical (Mol%)	Maximum (Mol%)
Ethane (C ₂ H ₆)	0	1	2
Propane (C ₃ H ₈)	50	64	80
Propylene (C ₃ H ₆)	20	34	50
Butanes and heavier (C ₄ +)	0	1	2.5

The background stream composition must be specified for proper calibration and measurement performance. Specify the normal 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.