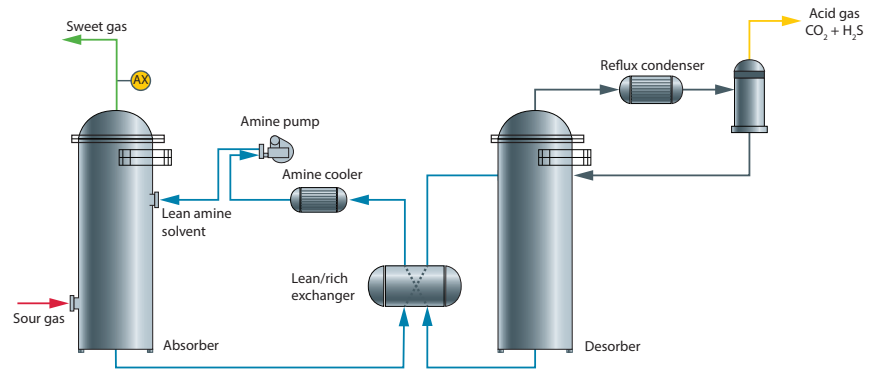# LNG: CO_2 in LNG amine unit

Amine treatment unit

Benefits at a glance
- Fast response to CO_2 concentration changes
- Laser based measurement is highly selective and accurate for CO_2 in natural gas
- Non-contact laser measurement avoids fouling and corrosion for reliable long-term operation
- Low maintenance and OPEX costs – no carrier gases or consumable items

Amine treatment and gas processing

Raw natural gas extracted from different geological formations contains varying amounts of acid gases (CO_2 and H_2S). The CO_2 concentration in gas intended for cryogenic liquefaction into liquefied natural gas (LNG) must be reduced below 50 ppmv to avoid solidification and damage to heat exchangers and plant equipment. Amine treatment units are commonly used in gas processing plants to remove CO_2 from natural gas.

Reduction and control of CO_2

In operation, sour gas is contacted with an aqueous amine solution which removes CO_2 by chemical reaction and absorption. Measuring the CO_2 concentration in sweet gas at the outlet of an amine treatment unit ensures the gas meets specifications for LNG or cryogenic liquefaction.

Endress+Hauser's solution

Tunable diode laser absorption spectroscopy (TDLAS) is a SpectraSensors technology that has proven highly effective for this critical gas processing measurement. TDLAS analyzers have an exceptionally fast response to changes in CO_2 concentration, an important performance characteristic for monitoring the efficiency of the amine treatment process and quality of the resulting natural gas product. 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 in the field.

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Application data

Target components	CO_2 in amine unit treatment outlet for LNG production
Typical measurement range	0-100 ppmv
Typical repeatability	±2 ppmv
Measurement response time	1 to ~60 seconds*
Principle of measurement	Non-differential tunable diode laser absorption spectroscopy (TDLAS)
Validation	Certified blend of CO_2 in N_2, or CO_2 in a balance that matches the normal stream composition.

*Application specific; consult factory.

Typical background stream composition

Component	Minimum (Mol%)	Typical (Mol%)	Maximum (Mol%)
Hydrogen sulfide (H_2S)	0	<2 ppmv	10 ppmv
Water (H_2O)	0	500 ppmv	1
Nitrogen (N_2)	0	0.1	3
Oxygen (O_2)	0	0	1
Methane (C1)	75	95	100
Ethane (C2)	0	3	10
Propane (C3)	0	1	5
Butanes(C4)	0	0.5	2
Pentanes and heavier (C_5+)	0	0.4	0.5

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 CO_2, the measured component. Other stream compositions may be allowable with approval from Endress+Hauser.

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