

Analysis of Pipeline-Quality Using a C6+ with Trace H₂S Application

Background

Hydrogen sulfide (H₂S) is a component that is often present in natural gas. There are many reasons for wanting to measure it. One of the most important reasons is that H₂S is a highly toxic gas that can be deadly if breathed into the lungs. This gas is also corrosive to the pipeline.

H₂S mixed with H₂O forms hydrosulfuric acid, which can cause pipeline metals to become brittle. Contractual obligation may require scrubbing or limiting of the H₂S in natural gas before it is sold. Each pipeline company has its own acceptable limits of how much H₂S can be present.

Natural Gas Transmission and Distribution

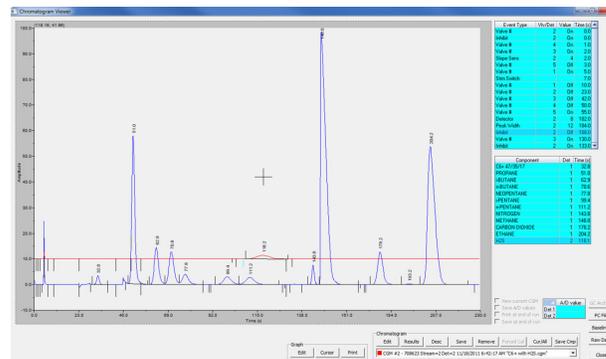
As in the standard C6+ application, the gas chromatograph supplies the heating value, gas composition, and relative density to flow computers for use in volumetric and energy calculations. However, this application also measures the trace amount of H₂S which can be a critical measurement in regards to personal safety, corrosion control, and contractual agreements.

C6+ with Trace Analysis Information:

Every five minutes the gas chromatograph injects a small sample of the flowing gas stream. The gas is then separated into the following components:

Component	Standard Measurement
C6+	Hexanes and heavier (0–0.5 %) ^(*)
C3	Propane (0–5 %) ^(*)
IC ₄	Isobutane (0–1 %) ^(*)
NC ₄	Normal Butane (0–1 %) ^(*)
NeoC ₅	Neopentane (0–1 %) ^(*)
IC ₅	Isopentane (0–1 %) ^(*)
NC ₅	Normal Pentane (0–1 %) ^(*)
N ₂	Nitrogen (0–15 %)
C1	Methane (0–100 %)
CO ₂	Carbon Dioxide (0–15 %)
C2	Ethane (0–15 %)
H ₂ S	Hydrogen Sulfide (0–30 ppm)

(*) Heavier concentrations can be measured but may require a heated sampling system to prevent drop-out.



C6+ with H₂S Dual Chromatogram

Exceptional Performance with Rosemount's Gas Chromatograph Products

- Maximum custody transfer accuracy and assurance
- ±0.05 % (±0.5 BTU / 1000 BTU) repeatability (±0.25 BTU / 1000 BTU when in a temperature-controlled building)
- H₂S ±3 ppm (±2 ppm when in a temperature-controlled building)
- H₂S detection range is 3–300 ppm
- All units temperature chambered (-18 °C to 55 °C) to ensure repeatability over the complete temperature range
- Reduced installation and maintenance costs
- No shelter required
- Chromatograph valves warranted for five years

Key Features:

- MON2000™ Intuitive Man Machine Interface software (Windows®-based)
- Four separately configurable serial ports (RS232, RS422, and RS485 Modbus protocol)
- Rack mount or integral explosion-proof controller (with optional keypad and display)
- Optional integral modem (no additional enclosures required)
- Dedicated printer port (parallel or serial interface)
- Class I, Div. 1 Groups B, C, and D (No air purge required)

Figure 1 - Oven 1: Used for measurement of C1-C6+, N₂, and CO₂

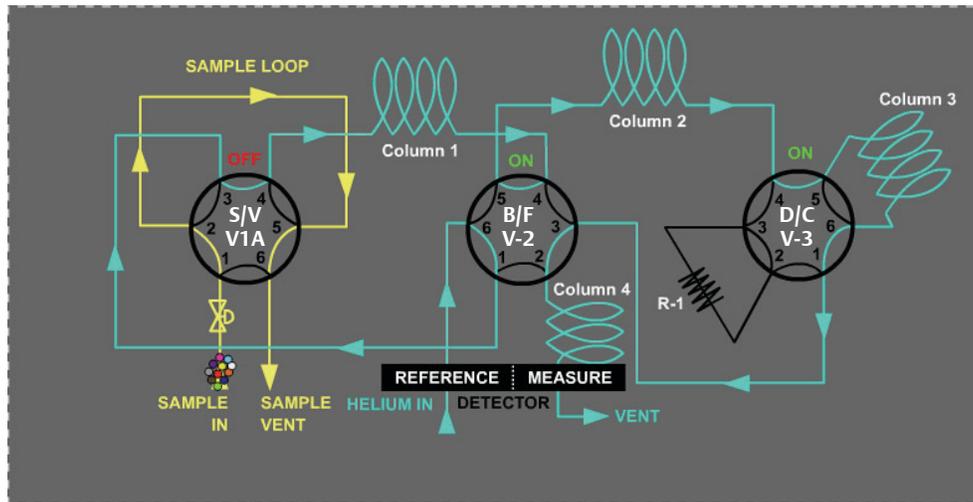
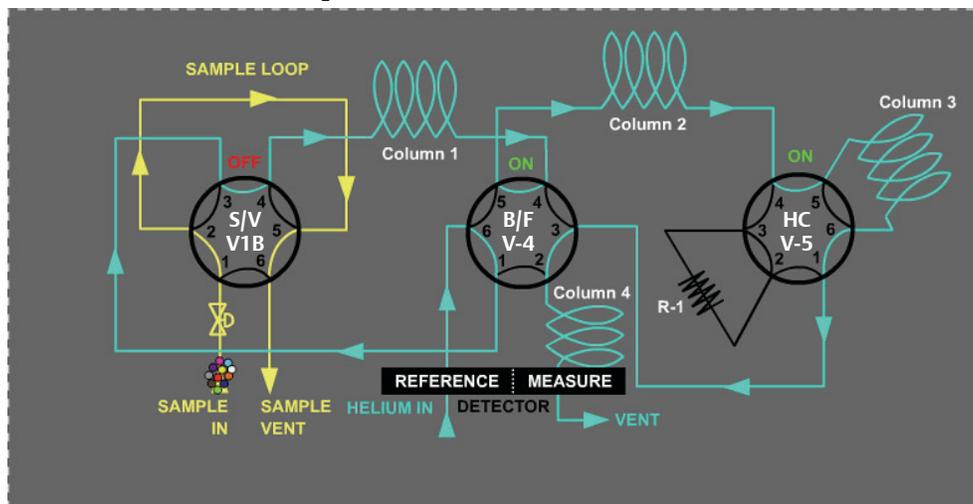


Figure 2 - Oven 2: Used for measurement of H₂S



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