

### REFERENCE METHODS

UOP539-12

#### CALIDUS™ CS UltraFast GC

Refinery Gas Analysis

GC analysis of Refinery Gas streams, i.e. fixed gases and C<sub>1</sub> to C<sub>6+</sub> hydrocarbons for laboratory, at-line, transportable, or on-line, in less than 6 minutes.

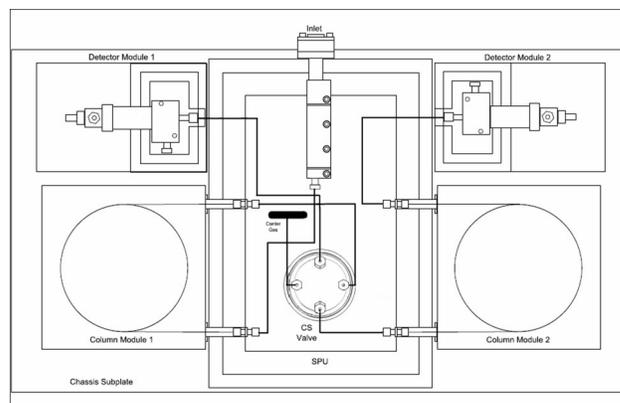


Figure 1: CALIDUS CS Functional Diagram

#### APPLICATION OVERVIEW

The Sample Processing Module with a standard split/splitless injection port, incorporating a heated gas sample valve, delivers the sample to a Programmed Temperature Column Module (PTCM) followed by a column switching valve. The column switching valve allows the fixed gases and C<sub>1</sub> to be switched (“heartcut”) to PTCM2 for further separation and detection by an independent detector. The inlet includes septum purge to prevent bleed components from entering the system.

The two PTCMs are independently controlled by the method.

PTCM1 contains a MXT-AluminaBond/Na<sub>2</sub>SO<sub>4</sub> resistively heated stainless steel capillary column and is operated in a temperature programmed mode. This column provides initial separation for the fixed gases and C<sub>1</sub>-C<sub>6+</sub>. The fixed gases and C<sub>1</sub> are heartcut and loaded onto PTCM2 for analysis and detection on Detector 2 (TCD). Analysis of C<sub>2</sub>-C<sub>6+</sub> remains on this flow path to detector 1 (FID). (See Figure 2)

PTCM2 contains a MXT-Shincarbon ST resistively heated stainless steel capillary column and is operated in a temperature programmed mode. This column provides further separation of H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, C<sub>1</sub>, and CO. (See Figure 3)

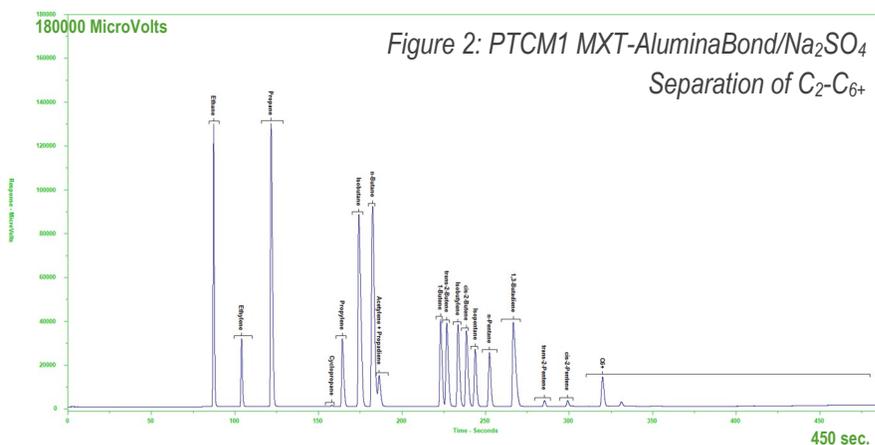


Figure 2: PTCM1 MXT-AluminaBond/Na<sub>2</sub>SO<sub>4</sub> Separation of C<sub>2</sub>-C<sub>6+</sub>

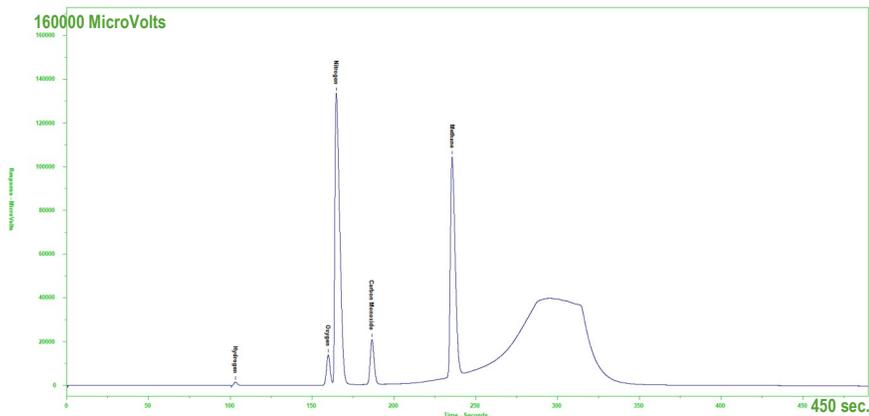


Figure 3: PTCM2 MXT-Shincarbon ST Separation of fixed gases and C<sub>1</sub>

# REFINERY GAS ANALYSIS

The analyzer includes the Chromperfect® chromatography data system, fully integrated, with InfoMetrix® LineUp™, running on a Windows PC for calculating and reporting component concentrations.

## Implications

Refinery Gas streams are a complex mixture of gases produced in the refinery processes. The determination of the composition can be a difficult, but vital process. Product quality and refinery process efficiency depend on the ability to perform this analysis.

- Parallel analysis utilizing FID and TCD
  - FID supports C<sub>2</sub>-C<sub>6</sub>+ hydrocarbon analysis with a LOD of 1.0ppm
  - TCD supports fixed gas analysis with a LOD of 0.01%
- Ideal for determining gas stream composition, with one instrument, in the laboratory, at-line, online, or in the field
- Enables greater product throughput for increased revenues and profits
- Smaller footprint means more bench top or analyzer shelter space. In the lab or the plant, space is always at a premium
- Speed and precision for quicker turnaround
- Reduction in utility and maintenance cost (i.e. power and consumables)

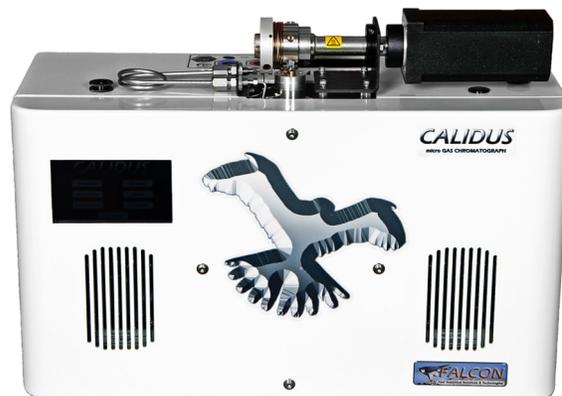
## Major Analytical Advantages

Fastest analysis time in the industry for Refinery Gas, with excellent performance and reliability.

Incorporates patented Resistively Heated Stainless Steel Capillary Column Module and its thermal management system, resulting in a paradigm shift in GC analysis.

Simplest hardware analytical approach for achieving Refinery Gas Analysis.

The most powerful, durable, compact and lightweight analytical solution for Ultra-Fast Refinery Gas Analysis (43 cm L X 21.5 cm D X 27.9 cm W, wt. 9.07 kg).



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