

## SPECIFICATIONS

<b>Configuration:</b>	1-3 channel instrument based on Thermo Trace or Focus GC, with FID or TCD.
<b>Optional:</b>	Second detector for easy method development.
<b>Sample tubing:</b>	Siltek® tubing for inert sample path.
<b>Application:</b>	Custom configured analyser for the analysis of oxygenated components (alcohols and ethers) in liquid Gasoline samples.
<b>Sample requirements:</b>	See our pre-installation guide for additional requirements.
<b>Analysis Time:</b>	25 minutes.
<b>Minimum detectability:</b>	Better than 0.01% for all individual components (depending on detector).
<b>Dynamic Range:</b>	Alcohols 0.1-12 mass%; ethers 0.1-20 mass%.
<b>Accuracy:</b>	Dependent on external calibration and repeatability.
<b>Repeatability:</b>	Better than 3%.

For more information:

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APPLICATION NOTE 204WA0712B

## Oxygenates Analyser

ASTM D4815

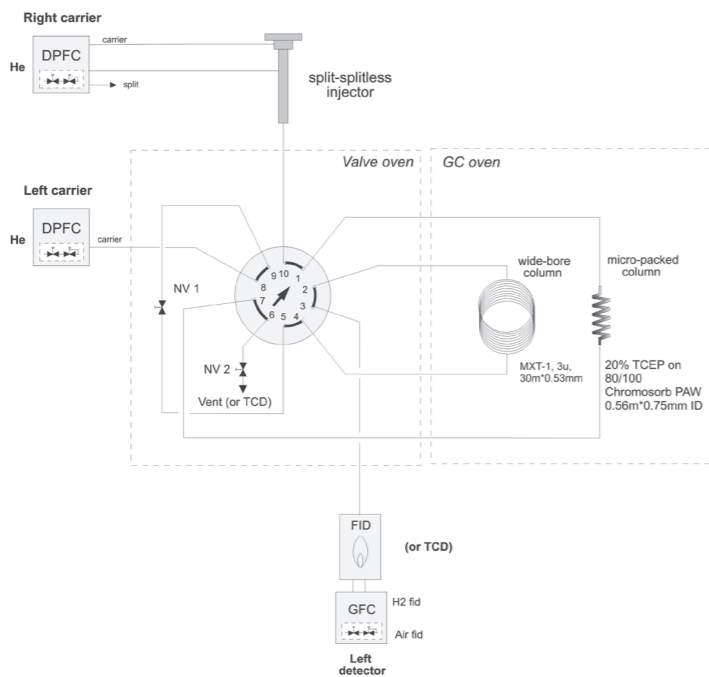
## Introduction

GAS offers custom configured GC analysers for complex separations, data processing and reporting. We have over 30 years of experience in designing and building turnkey analysers for many application fields. We invite you to take advantage of our latest hardware, software and column technologies to achieve the best possible results. Our analysers are designed to meet many accepted standard methods (like ASTM, UOP, ISO, etc.) in the Oil and Gas industry. The efficient hardware configurations are based on proven GC technology, resulting in rigid instruments with an optimal return on investment.

Automobile emission is reduced nowadays by replacing the usual anti-knock components with oxygenated additives like ethers and alcohols. The type and concentration of these various oxygenates are specified and regulated to ensure acceptable commercial gasoline quality. The American Society for Testing and Materials describes the determination of these compounds in their method D4815-99. Alcohols are analysed between 0.1 and 12 mass%, the individual ethers from 0.1 to 20 mass%.

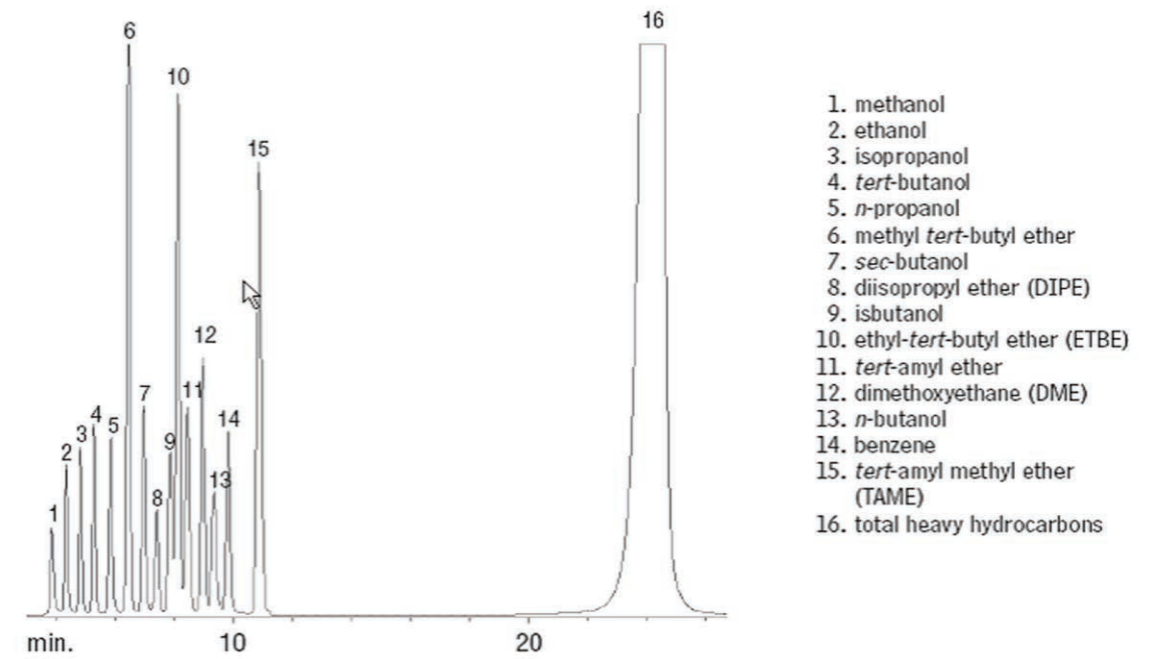
## System overview

The Global Analyser Systems D4815 oxygenates analyser uses a multidimensional configuration with two separation columns and a 10-port column switching valve. The analysis starts with the introduction of the gasoline sample using our versatile Split-Splitless vaporising injector. The first separation column is a highly polar micropacked column, and retains the oxygenates and the heavy hydrocarbons, while the light hydrocarbons are directed to a vent. The retained components are subsequently backflushed onto a non-polar wide-bore column by switching the valve, and the oxygenated compounds are separated according to their boiling point order. After eluting TAME (tert-amyl methyl ether), the valve is switched again and the heavy hydrocarbon fraction is backflushed and elutes as one composite peak. FID or TCD can be used for detection of the components. To prevent adsorption of oxygenates in the sample pathway, and to ensure symmetric peaks, Siltek®/Sulfinert® treated tubing is used. The 10-port valve is located in an independently heated isothermal valve oven, mounted on top of the GC, avoiding any cold spots and ensuring a long valve life time.



Schematic diagram of oxygenates analyser according to ASTM D4815

## Results



Chromatogram 1: oxygenated compounds

## Results

A Restek standard mixture is used to properly set the valve timings. Chromatogram 1 shows the obtained chromatogram of a gasoline sample, including the backflush peak of the heavy hydrocarbons (the light hydrocarbons are not seen in the chromatogram since they are vented). A linearity test of MTBE is also performed successfully to verify the systems efficiency. See figure 1.

## GC instruments

The Thermo Trace Ultra GC and Focus GC are both very suitable for this application when a single detector is used. The switching valve is located on top of the instrument, in a independent heated valve oven. When two detectors are required, for example to monitor the vent exit with TCD, the Trace Ultra GC is the best choice.

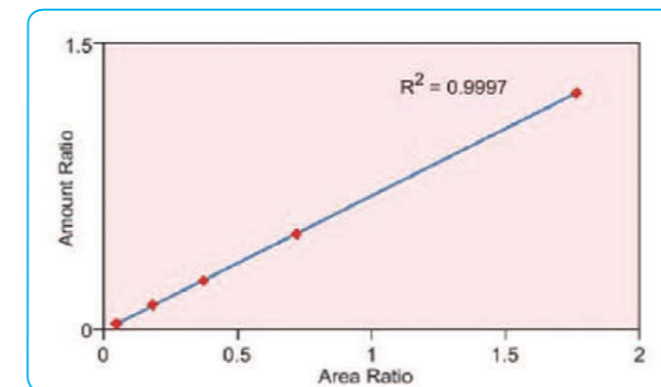


Figure 1: linearity test ASTM D4815



Two available GC platforms for ASTM D4815