

JAS Oxygenates Analyzer

according to ASTM D4815

jas Analyzer

Introduction

The JAS Oxygenates Analyzer is a dedicated turn-key analyzer for the analysis of oxygenates in finished gasoline according to the common used industry standard ASTM D4815.

The analyzer includes a JAS UNIS split-/splitless inlet, 10-port rotary valve, pre- and analytical column and FID. For the ease of use and best results we recommend to use an automated liquid sampler. Various models are optionally available.

Every analyzer is fully tuned and tested in the factory to meet the ASTM requirements.

This analyzer is being built on one of the current Agilent GC models. However, GC's from other manufacturers can also be used. This allows the user to choose his-/her preferred GC system, which fits the best in the lab.

Application Area

ASTM D4815 is 'the method to use' when it comes to the analysis of oxygenated hydrocarbons in finished gasoline and other related hydrocarbon matrices (liquids). Oxygenated compounds can be present as an 'anti-knock' additive to increase the octane number and decrease the emissions by replacing organo-lead compounds. But oxygenated compounds can also be naturally present or being formed during catalytic processes such as polymer production.



Key Benefits

Detailed analysis and quantification of oxygenated compounds in reformulated gasolines is necessary as part of ongoing product quality inspections, and to confirm the oxygenated compounds have been added in the correct amounts according to regulatory requirements. ASTM D4815 is frequently chosen as the standard method for the determination of oxygenated compounds including MTBE, ETBE, TAME, DIPE, and C1-C4 alcohols.

Although for most users the main focus is on MTBE and Ethanol. One of the most difficult situations that many D4815 users are facing is interference from non-oxygenate hydrocarbons, which co-elute with one of the oxygenated compounds. This could become worse when gasoline is blended with high olefin content naphtha. At present the method specifies that reporting limit is less than 0.20 mass% for individual oxygenates. However, when 5 or more of these <0.20 mass% peaks show up in the analysis, most users will ask themselves, how many of these are actually oxygenates and not interferences. The JAS Oxygenates Analyzer eliminates most –if not all– of these interferences issues.

JAS Oxygenates Analyzer

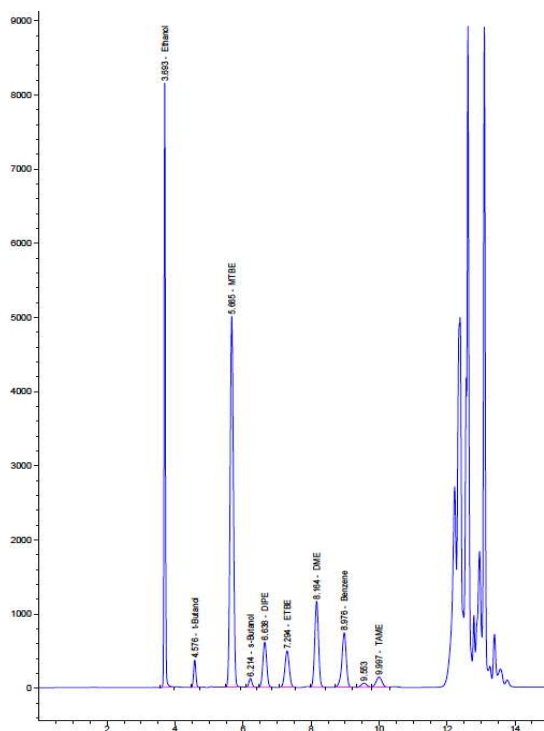
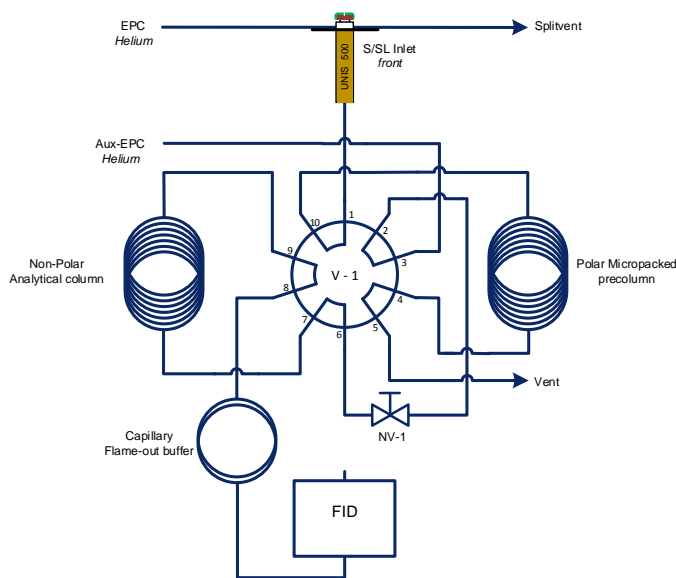
according to ASTM D4815

jas Analyzer

How does it work

The sample is first directed to the polar precolumn. This column has high retention for the polar oxygenated compounds, while the more volatile hydrocarbons are vented. Then valve is rotated, backflushing the remaining part of sample to the non-polar boiling point column, where the oxygenates are separated and detected via the Flame Ionization Detector (FID). After the elution of the last oxygenate (tert-amyl methyl ether), the valve is switched back and remaining heavy hydrocarbons are backflushed from the boiling point column, using pressure ramping to accelerate elution of the remaining components as a composite peak. This helps to reduce the analysis time.

An example chromatogram is shown below.



Alternative- or Additional Tuning

As the ASTM D4815 uses the same hardware as ASTM D5580, „Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C9 and Heavier Aromatics and Total Aromatics in Finished Gasoline by Gas Chromatography“, we can also tune this analyzer for this method. This results in a very economical analyzer package, all in one GC.

This ASTM D5580 method requires a sample to be injected twice in two different settings:

Method 'A' will determine Benzene and Toluene while the heavier fraction is backflushed to the detector.

Method 'B' is used to determine Ethylbenzene, p/m-Xylene, o-Xylene and the heavier fraction is backflushed to the detector and reported as a C9+ Aromatics composite peak.

References

ASTM D4815, „Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl alcohol and C1-C4 alcohols in Gasoline by Gas Chromatography“.

ASTM D5580, „Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C9 and Heavier Aromatics and Total Aromatics in Finished Gasoline by Gas Chromatography“, American Society for Testing and Materials, Philadelphia, PA.

Joint Analytical Systems GmbH

Carl-Zeiss-Straße 49
47445 Moers, Germany

Phone: +49 2841 / 9871-100
Fax: +49 2841 / 9871-222

Website: www.jas.de
E-mail: info@jas.de