

Application Data Sheet

No.28

System Gas Chromatograph

Aromatic Component Analysis Nexis GC-2030ACA1

A two-column chromatographic system equipped with a column switching valve and a flame ionization detector is used. A reproducible volume of sample containing an appropriate internal standard, such as 2-hexanone, is injected into a pre-column containing a polar liquid phase (TCEP). The C₉ and lighter non-aromatics are vented to atmosphere as they elute from the pre-column. A thermal conductivity detector may be used to monitor this separation. The TCEP pre-column is back-flushed immediately before the elution of benzene, and the remaining portion of the sample is directed into a second column containing a non-polar liquid phase (WCOT). Benzene, toluene, and the internal standard elute in the order of their boiling points and are detected by a flame ionization detector. Immediately after the elution of the internal standard, the flow through the non-polar WCOT column is reversed to back-flush the remainder of the sample (C₈ and heavier aromatics plus C₁₀ and heavier non-aromatics) from the column to the flame ionization detector. The analysis is repeated a second time allowing the C₁₂ and lighter non-aromatics, benzene and toluene to elute from the polar TCEP pre-column to vent. A thermal conductivity detector may be used to monitor this separation. The TCEP pre-column is back-flushed immediately prior to the elution of ethylbenzene, and the remaining aromatic portion is directed into the WCOT column. The internal standard and C₈ aromatic components elute in the order of their boiling points and are detected by FID. Immediately after o-xylene has eluted, the flow through the non-polar WCOT column is reversed to back-flush the C₉ and heavier aromatics to the flame ionization detector.

From the first analysis, the peak areas of benzene, toluene, and the internal standard (2-hexanone) are measured and recorded. Peak areas for ethylbenzene, p/m-xylene, o-xylene, the C₉ and heavier aromatics, and internal standard are measured and recorded from the second analysis. The back-flush peak eluting from the WCOT column in the second analysis contains only C₉ and heavier aromatics. The flame ionization detector response, proportional to the concentration of each component, is used to calculate the amount of aromatics that are present with reference to the internal standard. The system includes LabSolutions GC workstation software.

Analyzer Information

System Configuration:

One valve / packed and capillary columns with one FID detector

Sample Information:

Benzene, Toluene, Total C₈ and C₉ aromatics in Gasoline

Methods met:

ASTM-D5580

Concentration Range:

No.	Name of Compound	Concentration Range	
		Low Conc.	High Conc.
1	Benzene	0.1%	5.0%
2	Toluene	1.0%	15.0%
3	C ₈ aromatics	0.5%	10.0%

Detection limits may vary depending on the sample. Please contact us for more consultation.

System Features

- Using high sensitivity FID with single channel
- The first analysis: Benzene, Toluene and 2-Hexanone (internal standard) are measured and recorded
- The second analysis: 2-Hexanone, Ethylbenzene, p/m-Xylene, o-Xylene and C9+ aromatics are measured and recorded

Typical Chromatograms

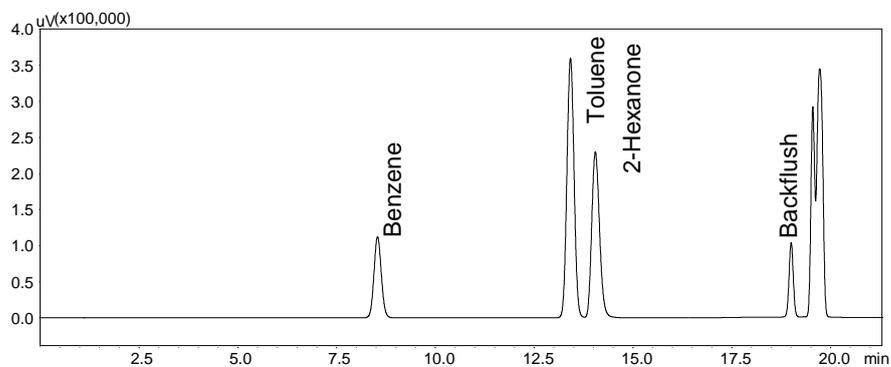


Fig. 1 Chromatogram of FID-1

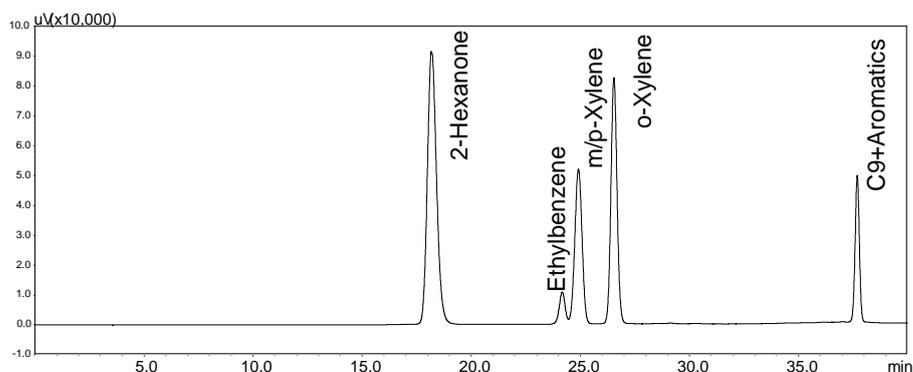


Fig. 2 Chromatogram of FID-1