

Optional LineUp™ Tool of the AC DHA Solutions Automates Signal Alignment

Product Brief



DETAILED HYDROCARBON ANALYSIS

One way to identify components is the detailed hydrocarbon analysis method, which uses a single column technology.

RANGE OF SOLUTIONS

AC offers several solutions for the detailed hydrocarbon analysis (DHA):

- the **DHA Front End** application to determine the light-end of crude oil
- the **Fast** application for a detailed hydrocarbon analysis in 28 minutes
- the **DHA ASTM D 6729** application
- the **DHA ASTM D 6730** application also determines oxygenates
- the **DHA ASTM D 6733** application
- the **DHA Combi** applications with a Combi inlet for the analysis of both light petroleum streams and crude oil

The AC DHA systems use an Agilent Technologies GC equipped with:

- An automatic liquid sampler
- A split/splitless injector
- An optional programmable temperature vaporizer for crude analysis (Combi)
- A dimethyl silicone capillary column
- A flame ionization detector

PREDEFINED APPLICATIONS

The AC DHA Plus software predefines the properties of the DHA application, such as retention index, molecular weight and response factor. The AC software is fully integrated with Agilent ChemStation and uses a single database as the Kovats Index is stored per sample type.

www.dha-analysis.com

PRECISE AND REPRODUCIBLE PEAK IDENTIFICATION

Chromatographic methods routinely in use to determine the composition of petroleum fractions show variability in retention times, which may result in false positive peak identifications. These retention time shifts force operators to manually review and occasionally intervene for ensuring a precise and reproducible peak identification.

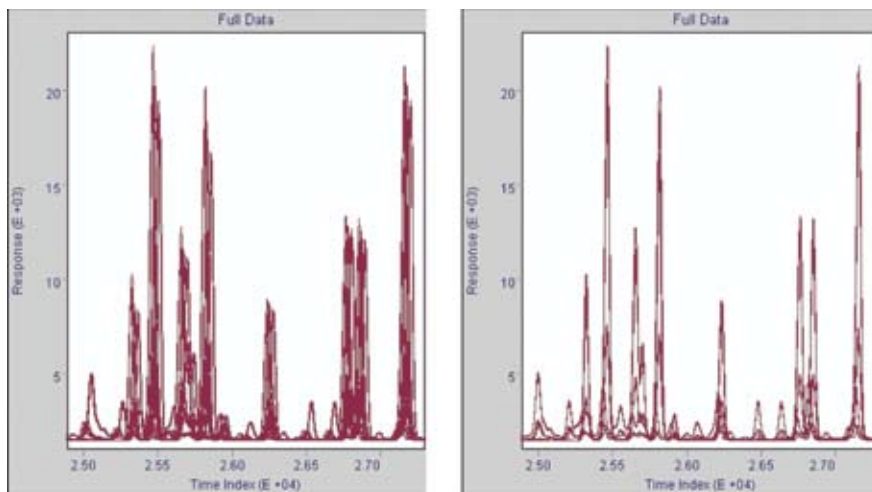
In cooperation with Infometrix, Inc., AC Analytical Controls developed the optional feature of the Detailed Hydrocarbon Analysis (DHA) solutions: an automated signal alignment tool that can considerably eliminate the run-to-run variability and minimize the need for manual intervention.



AC DHA Solution

AUTOMATED ALIGNMENT

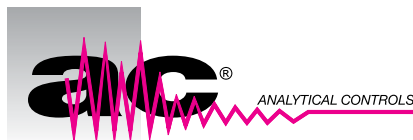
The AC DHA Plus software option incorporates the alignment technology provided by Infometrix: **the LineUp tool***. The LineUp software provides analysts with a fully automated option to stabilize retention times. Based on a correlation optimized warping algorithm**, the LineUp tool aligns a chromatogram's retention axis to a target chromatogram. Even variation in column loading, column aging and/or flow can be corrected.



Chromatogram before and after alignment

* Not tested for dual channel applications

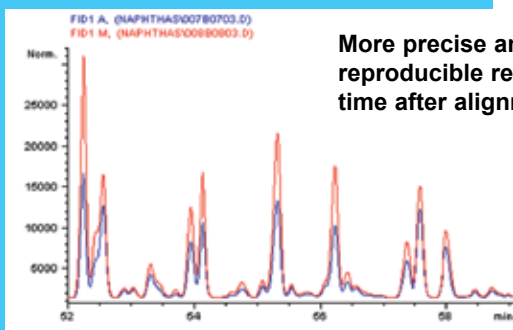
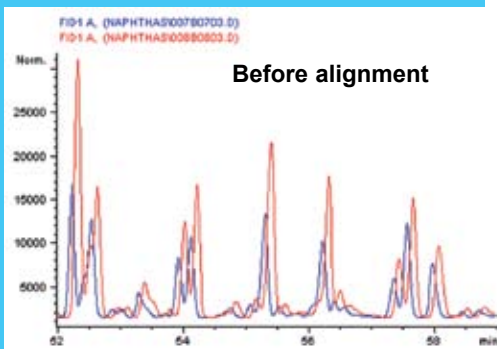
** Nielsen, N-P. V.; J.M. Carstensen; and J. Smedsgaard, Aligning of single and multiple wavelength chromatographic profiles for chemometric data analysis using correlation optimized warping, J. Chromatogr. A, 805:17-35 (1998)



PRECISE AND REPRODUCIBLE PEAK IDENTIFICATION

The algorithm in LineUp stabilizes the retention times of the detailed hydrocarbon analysis. The DHA applications use an n-Paraffin calibration to calculate the peak indices. The indices show a deviation of about one index point, which is defined as the minimum index point.

Alignment allows the index windows to be reduced to a minimum of 0.2 index points, which contributes to the peak identification as shown in the table.



Component	Index	Range Before Alignment	Standard Deviation	Range After Alignment	Standard Deviation
2-methyl-hexane	668.0	0.4	0.10	0.1	0.03
ethylcyclopentane	735.6	0.4	0.12	0.1	0.03
4-methyl-heptane	772.6	0.4	0.10	0.0	0.00
ethylcyclohexane	831.2	0.3	0.09	0.1	0.02
1,1,4-trimethylcyclohexane	837.0	0.4	0.11	0.0	0.00
ethylbenzene	850.3	0.4	0.10	0.0	0.00
1,3-dimethylbenzene	860.0	0.4	0.10	0.0	0.00
2-methyloctane	872.3	0.4	0.09	0.0	0.00
n-propylbenzene	946.6	0.3	0.10	0.0	0.00
1,2,4-trimethylbenzene	983.4	0.3	0.09	0.1	0.02

Fast DHA results of 20 analyses at customer site

COMPLETE INTEGRATION

LineUp is designed to run invisibly. Just specify the alignment target and select the LineUp options in the software.

The LineUp tool processes each sample automatically and is completely integrated into the DHA method. This minimizes the need to review the chromatograms by an analyst.

The optional alignment tool allows results to be compared over a number of years. GC results can be objectively analyzed and consistently interpreted throughout the company's operations.

Ideally, the optional LineUp tool will assist analysts in performing a precise, reproducible DHA analysis on-line using a global chromatographic data base.

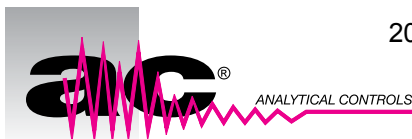
FEATURES & BENEFITS

- ✓ Automated alignment minimizes the need for human intervention and shows a more precise and reproducible retention time
- ✓ Optional LineUp technology is completely integrated into the detailed hydrocarbon analysis method
- ✓ Range of choices for detailed hydrocarbon analysis
- ✓ Predefined settings contribute to a reliable peak identification
- ✓ Analyzer fully integrates with proven Agilent and Microsoft technologies
- ✓ Qualified support engineer installs system on-site and familiarizes users with operation
- ✓ One year warranty covers hardware and application
- ✓ Analyzers include free helpdesk assistance for any hardware or software related questions
- ✓ Optional on-line remote support by LAN connection is available

www.dha-analysis.com

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