

## High Performance Liquid Chromatography Technologies

### Latest HPLC and column measurement technologies

Latest advances in HPLC technology include the development of highly compact HPLC systems that provide greater diagnostic sensitivity and specificity for detecting a wide range of Compounds. Design features include intelligent software, precise solvent delivery systems, ease of operation and smaller footprint.

For fuels testing applications, these latest HPLC systems provide the basis for an entirely fresh approach to the development of more precise and specific analytical solutions.

### Conventional HPLC test methods

A potential drawback with many conventional HPLC procedures, particularly in laboratories involved with differing test applications, is that routine replacement of the HPLC column is often needed. Such replacements may have significant implications on test performance where even an experienced technician may find that a new column of the same designation and source might not reproduce the original separation or even meet system suitability.

One solution to this problem is the use of **total solution** HPLC 'packages' that are designed for specific test applications with both column and software being fully configured to provide known performance for the compound being tested...allowing plug & go operation.

The 'total solution' approach means that the lengthy process of rigorously testing each column before use is avoided, the system being ready for immediate use.

**SetaAnalytics** are working with the fuels industry to develop HPLC systems for a range a dedicated analytical requirements and to offer more up-to-date technology as an advance over many existing testing procedures.

### Traditional FIA techniques

Traditional techniques for the aromatic content measurement in fuels involve open column classical separation techniques such as those specified in ASTM D1319 - *Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption (FIA)*. This method is a lengthy test procedure needing appreciable operator skill, interpretation and time. In addition this type of separation does not permit precise, real-time measurements to be made and results are difficult to replicate consistently.

ASTM D1319 test method involves the use of a significant amount of specially treated and costly silica stationary phase and may expose operators to open fuel sampling and large amounts of solvents. The traditional FIA test takes considerable time in cleaning and replacing columns, which can inhibit rapid sample turn around.

Significantly it is recognised that determination of aromatics by FIA column chromatography is not a fool proof means of accurately assessing the value of the key aromatic classes. The speed of separation is relatively slow and, depending on the skills and ability of the technician, the separation of the aromatic bands can be diffuse and difficult to discriminate and measure.

### Determination of aromatics by HPLC

Industry standardisation bodies, including ASTM, CEN and EI(IP) are working to introduce more robust HPLC test methods to allow the measurement of the key aromatic classes, Mono, Di and Total aromatics as specified in DEF STAN 91-91 (Jet A-1) and CEN EN 590 (diesel fuel). HPLC technology is regarded by many as the key to enabling the industry to provide quality product data to show conformance to government regulatory requirements.

**SetaAnalytics 'Evochrom' Diesel Analyser** has been developed to meet this requirement. The system incorporates advanced HPLC columns and software developed exclusively for the determination of aromatics in full conformity to the precision requirements of relevant fuel specifications. The convenient 'plug & go' system contains pre-packed column kits made from different silica lots and independently synthesized to validate method ruggedness.

'**Evochrom**' offers the most up-to-date technology, high precision, dedicated testing and repeatable results without the need to change columns.