



Lock in the Power of Gas Chromatography with RTL

- Improving Reliability and Precision Analyzing Oxygenates in Gasoline

The unique retention time locking (RTL) software from Agilent Technologies revolutionizes gas chromatography. With RTL, retention times (RT) can be reproduced within hundredths, even thousandths, of a minute from one Agilent GC based system to another. Be it between 6890 or 6850 GC systems or one 6890/5973 inert MSD system to another, RTs are virtually identical, regardless of inlet, detector, operator, or location.

This technique is an easy and economical way to improve confidence in results, reduce the risk of non-compliance, and reduce operating costs. All that is required is the RTL software, an Agilent 6890 or 6850 GC (equipped with Agilent's industry-leading electronic pneumatics control (EPC)) or an Agilent 6890/5973 inert MSD system, and the Agilent ChemStation for GC or MSD.

RTL - Real Performance Advantages

- Removes the need to update calibration table RTs, timed events, and integration events tables when a 6890/6850 method is transferred, a column installed or routine maintenance performed
- Ensures results that are easy to compare, document and explain
- Lock on a peak and reproduce exactly a 6890/6850 method developed in another laboratory
- Reproduce exactly the RTs from a published 6890/6850 method
- Allows fast setup and testing plus decreases method development time
- Delivers simplified method and system validation
- Provides fast, accurate identification of unknowns through retention time library searching

Improved Reliability and Precision for ASTM Method D4815

ASTM method D4815 is used to measure oxygenated additives in gasoline. The species of interest include ethers such as MtBE, EtBE DIPE, TAME at 0.1 - 20.0 wt% and alcohols - C1 to C4 and t-pentanol at 0.1 - 12.0 wt%. There are usually only 1 or 2 oxygenates in a sample. The scope of the original application was to improve this method, making it easier and to provide greater confidence in results using RTL.

The method calls for a polar TCEP micropacked column to provide preliminary separation and remove light hydrocarbons. Trapped oxygenates are back flushed to the capillary column and this is the key to success. Variations in the back flush time caused by the TCEP pre-column make RTL difficult to apply.

TCEP columns are generally difficult to prepare. The small dimensions of the column, the means in which wire is used as plugs and the use of crimping to hold in the wire lead to variations in column head pressure.

In addition, potential temperature variations can occur if the pre-column in the valve box is not uniformly heated, making it difficult to accurately set the back flush time.

Problems with head pressure can be overcome with the use of screen plugs, while wrapping the column and mounting it on a heated mandrill can address temperature variations. Once these problems have been solved, precise back flush times can be achieved and the RTL software can be used to accurately lock in the data. For ASTM method D4815, MtBE acted as the target peak for locking and RTL calibration was performed after back flush time optimization. Sample data for 5 different 6890 GC systems before and after RTL correction are summarized in Figures 1 (before) and 2 (after).

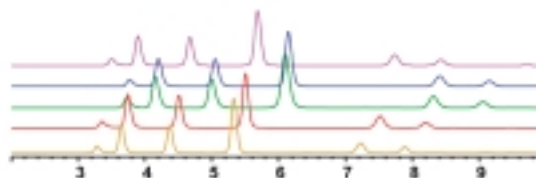


Figure 1 Chromatograms of oxygenates in gasoline from five different 6890 GC systems before locking

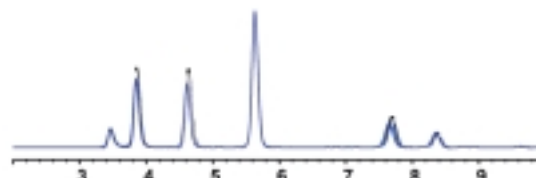


Figure 2 Chromatograms of oxygenates in gasoline from 5 different 6890 GC systems after locking

Table 1 summarizes results on replicate analyses using the modified method and illustrates the superb reproducibility. %RSDs exceed the ASTM requirements by a factor of 10.

Compound	Mass%	Repeatability		Reproducibility	
		Spec	Observed	Spec	Observed
Ethanol	0.99	0.06	0.01	0.23	0.01
Ethanol	6.63	0.19	0.03	0.68	0.04
MtBE	2.10	0.08	0.01	0.20	0.01
MtBE	11.29	0.19	0.05	0.61	0.08

Table 1 Replicate analyses of oxygenates in gasoline

Summary

Agilent's unique Retention Time Locking (RTL) software is an excellent means of improving RT reproducibility across various Agilent GC and GC/MS systems improving simplified method development and system validation. For more information on this and other Agilent Solutions for the petroleum/petrochemical industries log onto www.agilent.com/chem/hydrocarbon or contact your local Agilent Technologies, Life Science Chemical Analysis representative.

