

## **SUPERCRITICAL FLUID CHROMATOGRAPHY USING THE THAR PetroAnalyzer FOR ANALYSIS OF PETROLEUM DISTILLATES AND BIODIESEL**

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Supercritical fluid chromatography (SFC) with flame ionization detection (FID) can be used to determine the olefin content of gasoline using ASTM method D6550 and the aromatic content of diesel fuel with ASTM method D5186. The instrument employs a column packed with silica and is isobarically eluted with CO<sub>2</sub> at 200 bar to perform the required separations.

The states of Washington, Oregon and Pennsylvania have recently passed mandates that require that diesel fuel sold there must contain at least 2 weight % biodiesel. Other states are expected to follow. Biodiesel is derived from plant and animal triglycerides that have been processed into fatty acid methyl esters (FAME). We have recently extended the application range of the PetroAnalyzer to include several SFC/FID methods for analysis of biodiesel. The first method is useful for analysis of B100, and allows one to determine the FAME at each carbon number, the total FAME, total mono-, di- and triglycerides, free fatty acids and methanol content of the biodiesel. This method is useful for analysis of process streams within a biodiesel processing facility, and is useful for quality control of B100 coming into a refinery that will be blended with diesel. It is based supercritical fluid chromatography using a short silica column. The second method allows one to determine the biodiesel content of diesel fuel over the range of about 0.1 to 25 weight % biodiesel. This SFC method was originally described by Diehl and DiSanzo and also employs a silica column. The second new methods is useful to refineries that are required to show that their diesel fuel contains 2 weight % biodiesel and for state regulators that periodically sample commercially available diesel fuel and test for compliance.

Results of analyses of the total aromatic content of diesel fuel and the olefin content of gasoline will be presented and discussed, along with examples of the analysis of B100 and the analysis of the total FAME in diesel fuel.