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**THE DEVELOPMENT AND USE OF FLOW ANALYSIS BY FTIR SPECTROSCOPY
IN A RAPID SCREENING TEST METHOD FOR MEASURING TRACES OF FATTY
ACID METHYL ESTERS IN AVIATION TURBINE FUELS**

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The present and growing international governmental requirements to add Fatty Acid Methyl Esters (FAME) to diesel fuel has had the unintended side-effect of leading to potential FAME contamination of jet turbine fuel in multi-fuel transport facilities, and industry wide concerns..

The aircraft and engine manufacturers have conceded that unmeasurable levels of FAME (<5 ppm) are acceptable. However the aviation industry, in conjunction with the Energy Institute, is moving towards acceptance of 30 to 100 ppm limits. For the purpose of quality assurance, this has created the need for robust and fast instrumentation to detect these levels of contamination.

To meet this urgent demand for test methodology, the Energy Institute started two initiatives: to develop an analytical and a rapid screening test method.

Following an in-house development programme started in 2007, Shell Global Solutions started a collaborative effort with Stanhope-Seta in 2008 to develop a procedure and apparatus based on the use of Solid Phase Extraction (SPE) cartridge technology and IR spectroscopy. This resulted in an extraction based Fourier Transform Infra Red (FTIR) analytical technique (Laboratory Analytical Method) that exhibits a proven ability to measure down to 5 ppm levels. However this analytical technique requires the use of solvents in a laboratory environment and is therefore unsuitable as a rapid screening test.

Stanhope-Seta has now developed a new technique using flow analysis by FTIR (FA-FTIR), that is automated and does not require solvents. Extensive testing indicates that measurements down to 30 ppm are possible and this technique is being standardised by a new EI Rapid Screening Test method.

This paper discusses the development and performance of the new Rapid Screening Test method for the measurement of 30 to over 100 ppm (mg/kg) of FAME in aviation turbine fuel and introduces the instrumentation required to carry out the rapid screening test.