Biodiesel in Diesel (FAME)

Summary Information

- Correlates well with ASTM D7371
- Portable and battery operated
- Mid Infrared Spectroscopy

Product Description

The IR Sphinx spectrometer measure the mid-infrared spectrum of a sample and extract relevant parameters. The spectrometers do not contain any moving parts but use a solid state dispersion element in combination with black body infrared emitters to measure the infrared spectrum of a sample. This results in a unique product which is robust, battery operated and weighs less than 0.5 kg. The spectrometer can be configured to measure from 2.5 µm–5.0 µm or from 5.5 µm–11.0 µm. The IR Sphinx spectrometer come with a sophisticated but user friendly software called Sphinx Suite. The software is modular and the user can choose from a number of different software modules. The software is compatible with many common operating systems.

Application

The FAME content in biodiesel is an important parameter as it can have significant influence on the quality and the performance of the fuel. FAME blended biodiesel have the tendencies to react and to form acidic by-products that can reduce the lifetime of the engine.
FAME blended fuels are also not allowed in many applications such as jet fuels etc. and it is therefore important to be able to quickly check the FAME content for quality control purposes.
In addition fuel storage tanks have to be managed to ensure that no cross contamination with FAME occurs during the storage of different fuel types.

How to use:

The IR Sphinx spectrometer enable the user to quickly measure the FAME concentration of a biodiesel sample. Depending on the product range the measurement is carried out in a slightly different way. For the IR Sphinx ATR products the oil sample placed on top of the ATR crystal making sure that the entire crystal is covered by the oil.

For the IR Sphinx transmission products the oil sample has to be present in the sample chamber. The transmission systems are best suited for inline measurement where the oil sample is delivered t the sample holder via a pumping system. Alternatively a syringe can be used to deliver the sample to the sample holder.

Once the sample is in place the measurement is started from the software. After about 30 s the analysis of the sample is available.

Results & Performance
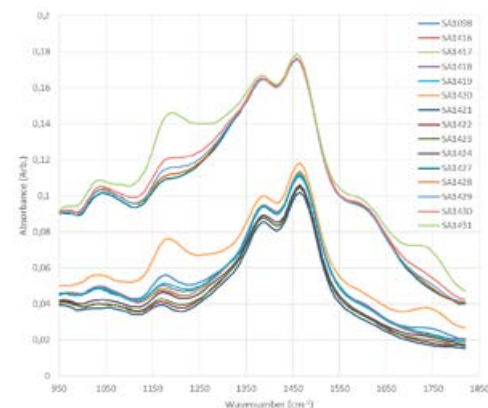
Infrared absorption spectra of two different fuel samples contaminated with FAME.

	Range (%)	FTIR Model		LVF ATR Model	
		R² (%)	Std. Error	R² (%)	Std. Error
Mono-glycerides	0-2,8	91.4	0.12	88.5	0.2
Di-glycerides	0-5,5	97.2	0.14	96.9	0.18
Di-glycerides	0-1,2	87.5	0.09	85.6	0.14
Tri-glycerides	0-13,1	95.4	0.25	95.9	0.5
Tri-glycerides	0-2,5	71.4	0.15	80.4	0.22

Comparison of the detection accuracy against a FTIR spectrometer. The comparison is shown for different glycerides and different concentrations.