

Bio Fuels Measurement, especially Bio-ester measurement for Manufacturing Quality Control and Diesel Fuels Blends

In recent years there has been a significant move by governments globally to encourage the use and blending of bio components in road transport fuel. Major initiatives in the European Union, with new Commission Directives in 2003, set down a road map for the European states to achieve targets for both gasoline and diesel fuels.

In the US one of the main drivers has been an oxygenate mandate. The US State Fuel Logistics Department has been set a target of achieving a bio component level of 20% in all road fuels by 2020. Another major factor is security of supply, for countries without supply of local crude oil the option to maximise bio fuel components in ground based fuels is very compelling.

First generation Bio fuels include the conversion of sugar or starch products to produce ethanol and alcohol ethers (MTBE, TAME etc) for gasolines. In the case of diesel the esterification of vegetable oils (such as Palm, Soya, Rapeseed and Tallow) are reacted to give Bio esters, hydrogenated esters and FAEE ethyl esters. Second generation Bio Fuels are already under development and will be derived from Ligno-cellulosic ethanol and biomass to liquids (BTL).

The use of bio fuels in road transport fuels varies from 100% bio component fuels – ethanol or bio-ester, often referred to as E100 or B100 – to more commonly used blends of alcohols in gasolines, or esters in diesels in the range of 5, 10 or 20%. In some countries the mandated levels are set for a particulate type or class of fuel.

The measurement of bio esters as a neat material in the case of production following esterification or as a component extender in a diesel blend is extremely important. This is especially relevant where there are mandated levels and the range of bio extender used is highly regulated, or where there are tax concessions.

The measurement of Bio ester components can be split into two analytical approaches. Firstly, for detailed qualitative and quantitative measurement expensive non-portable GC apparatus is used and requires a highly trained operator.

The alternative more flexible approach is using RF Sensor technology. SetaAnalytics' EsterCheck is the ideal qualitative and quantitative analytical tool; it is easy to use, fast (2 seconds) and does not require a highly qualified lab technician. The EsterCheck utilises a very robust optimised sensor, with no moving parts.

Many different types of oils esterified bio components can be measured using EsterCheck and the sensor is also able to detect non refined vegetable oils, gasoline or water. The unit is highly portable with an integral battery pack to aid flexibility – for use out in the field for checking fuels and measuring bio-ester component – giving an absolute bio-ester value.