



## Supporting biofuel-ready vehicles

The Renewable Energy Directive requires all EU countries to ensure that 10% of their transport fuel comes from renewable sources by 2020. Biofuels, such as biodiesel and bioethanol, will be instrumental in helping countries meet this target, reducing greenhouse gas emissions and improving the security of Europe's energy supply.

### Europe's National Measurement Institutes working together

The European Metrology Research Programme (EMRP) brings together National Measurement Institutes in 23 countries to address key measurement challenges at a European level. It supports collaborative research to ensure that measurement science meets the future needs of industry and wider society.

## Challenge

Biofuels are gradually being introduced across Europe's transport sector through low-level blending with conventional fuels – of bioethanol in petrol and biodiesel in diesel. Ahead of large-scale implementation, given the significantly different chemical and physical properties of biofuels, we need a better understanding of how they affect engine performance, reliability and safety to build consumer confidence.

Higher proportions of bioethanol in a vehicle's fuel mix can lead to engine corrosion. To overcome this problem, engine developers need to identify materials which can effectively resist the corrosive effects of bioethanol and be used to build safe, efficient biofuel-ready engines. This depends on developers being able to reliably assess the level of corrosiveness of a given bioethanol blend.

The pH value of bioethanol (pHe) can be used as a quick and simple indicator of its corrosiveness, but conventional methods for measuring pH values cannot be applied to bioethanol and, until recently, no internationally-accepted reference methods existed to support accurate, comparable pHe measurements.

## Solution

The EMRP project *Metrology for biofuels* developed a reference method to serve as a best practice example for making pHe measurements. These practices have been incorporated into the new ISO standard (17315:2014), Petroleum products and other liquids - Ethanol - Determination of total acidity by potentiometric, enabling users to make pHe measurements of the highest accuracy and reliably compare them across the world.

## Impact

International adoption of the new reference method through the ISO standard will enable engine developers to accurately measure the corrosiveness of bioethanol and reliably compare the ability of materials to resist its corrosive effects. Developers will then be able to confidently identify the most suitable materials for use in next-generation engines, built to withstand bioethanol blends.

By enabling the development of biofuel-ready engines and building consumer confidence, this new measurement capability will support higher levels of biofuel blending in Europe's transport fuels. This is an important step towards the increased adoption of low carbon biofuels across Europe, which will be crucial to meeting EU targets for renewable transport fuels.

## Metrology for biofuels

The EMRP project *Metrology for biofuels* has made important steps towards European and international harmonisation of the measurement methods for biofuels and their blends with fossil fuels. In addition to pHe measurements, validated, reliable and traceable methods were developed to measure a range of the physical and chemical properties of biofuels, particularly those used in the automotive and aviation sectors.

The results of this research will accelerate the expansion of new technologies, such as engines designed to run efficiently on biofuels. Furthermore, the development of traceable methods for biofuels will help prevent economic subsidy fraud, where subsidies for producers are falsely claimed, and improve investor confidence.



# EMRP

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[www.euramet.org/project-ENG09](http://www.euramet.org/project-ENG09)

Paola Fiscaro

LNE, France

+33 1 4043 3759 | [Paola.Fiscaro@lne.fr](mailto:Paola.Fiscaro@lne.fr)

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