

THE USE OF POLARIZED LIGHT ED-XRF FOR LOW SULFUR CONTENT DETERMINATION IN AUTOMOTIVE FUELS

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Sulfur in automotive fuels originates mainly from the refinery process. Due to environmental and technical reasons, the European Community decided that the future regulation for the sulfur content in all automotive fuels will be maximum 50 ppm, effective from 2005. Some countries already have more severe regulations or will, via tax-incentives, encourage the use of automotive fuels with a sulfur content of maximum 10 ppm. This 10 ppm specification will obviously become general starting from 2010.

In view of the future sulfur regulations at that moment, a first round robin was carried out by the CEN TC19 WG27 in 1998-1999 in order to compare sulfur content determination methods for sulfur levels no greater than 0.10% (m/m). As a result, three new ISO standards were developed:

- ISO/CD 20884 - Wavelength dispersive X-ray fluorescence method;
- ISO/CD 20847 - Energy dispersive X-ray fluorescence method;
- ISO/CD 20846 - Ultraviolet fluorescence method.

Due to the more severe regulations regarding the future maximum specification of the sulfur content and due to recent developments in the instrumentation, a second round robin was carried out in 2001. This work was done to better define the precision of test methods in the range 1- 60 mg/kg, and to provide useful information in order to update methods for petrol and diesel fuel at 10 and 50 mg/kg sulfur content.

This paper highlights recent developments in Polarized Light ED-XRF in order to improve the sensitivity and accuracy in the low ppm range, as there are:

- the use of a detector with a larger detector surface area;
- the use of an ultra-stable sample plate;
- optimization of the arrangement sample holder - sample cup.

The paper also presents the actual position of ED-PXRF amongst the other techniques, as there are;

- Full power WD-XRF and medium power WD-XRF, both procedures with and without the use of internal standard;
- ED-XRF;
- UV-Fluorescence.

The comparison data originate from CEN TC19 WG 27 report recently published and from lab experiments.