Application Note EDXRF1760

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EDXRF1760 - Manganese in Gasoline

Scope

The measurement of manganese (Mn) in gasoline is demonstrated.

Background

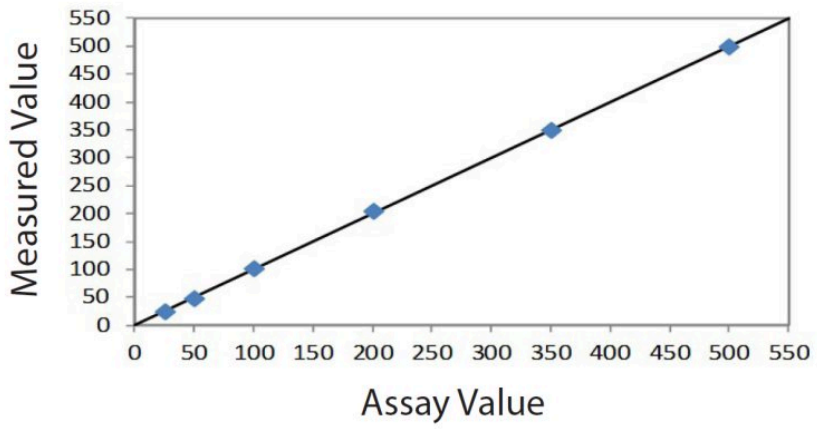
Methylcyclopentadienyl manganese tricarbonyl (called MMT or MCMT) is an anti- knock agent added to motor gasoline and AvGas to boost octane rating, replacing tetraethyl lead (TEL) in many regions of the world. In motor gasoline, the Mn content is typically between 50 – 500 mg/kg, and can be as high as 3000 mg/kg (approximately 3 g/L) in AvGas. Reliably characterizing the Mn content of gasoline ensures optimum engine performance based on the engine's compression ratio and other geometrical and mechanical operating conditions. To meet the needs of the industry, Rigaku offers NEX QC+, a simple and versatile benchtop EDXRF analyzer for the analysis of manganese in gasoline.

Calibration

Empirical calibration is made using commercially available certified gasoline calibration standards containing the Mn additive. A typical calibration is demonstrated here for the range 25 – 500 mg/kg Mn.

Element: Mn **Units: mg/kg**		
Standard I.D.	**Assay value**	**Measured value**
1	25	24.2
2	50	47.4

3	100	101
4	200	204
5	350	349
6	500	499



Calibration plot Mn

Precision

Instrument repeatability (precision) is determined by ten repeat analyses of each sample in a static position.

Element: Mn **Units: mg/kg**				
Sample I.D.	**Assay value**	**Average value**	**Std. dev**	**% Relative**
1	25	23.5	0.6	2.6%
3	100	101	1.4	1.4%
6	500	501	4.2	0.8%

Conclusion

The results shown here indicate the Rigaku NEX QC+ EDXRF analyzer can be used to reliably measure Mn in gasoline and AvGas without the need to use an internal standard.

Related products

NEX QC II Series

Compact, intuitive benchtop EDXRF for everyday elemental testing