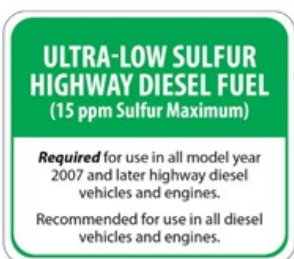


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EDXRF1272 - Analysis of ULSD and gasoline



Scope



This application note demonstrates the analysis of sulfur in ULSD (ultralow sulfur diesel) and the measurement of ultralow sulfur in gasoline using [NEX QC+](#).

Background

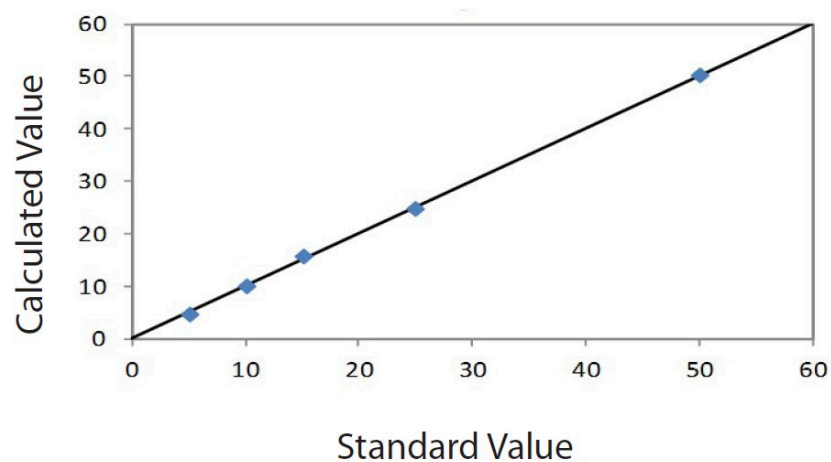
Regulations around the world have limited the amount of sulfur in various fuels oils with particular attention to diesel fuel. For many years, road diesel has been limited to a maximum sulfur concentration between 10 – 15 ppm, depending on the global region. Now, these limits are expanded to all diesel fuel, including use in large engines and off-road diesel engines.

Diesel

Calibration

Empirical calibration was built using a suite of six certified diesel calibration standards.

Element: S Units: ppm		
Sample ID	Standard value	Calculated value
STD 1	5.0	4.7
STD 2	10.0	10.1
STD 3	15.0	15.5
STD 5	25.0	24.7
STD 6	50.0	50.0



Precision

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

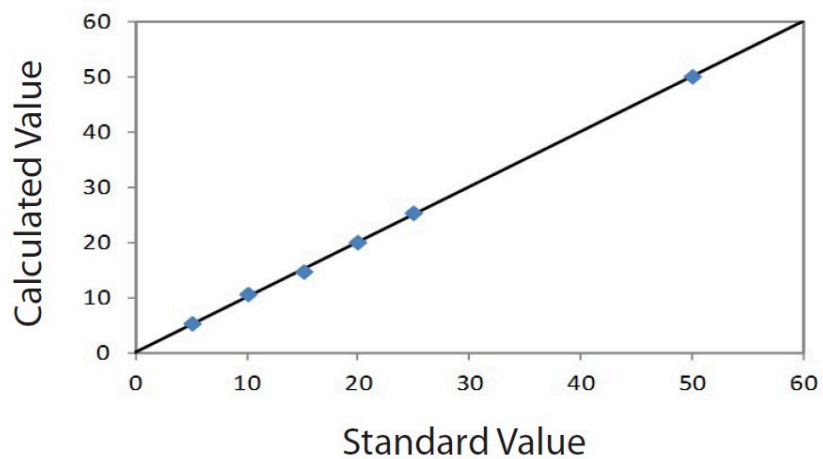
Element: S Units: ppm				
Sample	Standard value	Average value	Std. dev	% Relative
STD 2	10.0	10.2	0.48	4.8
STD 6	50.0	50.9	0.50	1.0

Gasoline

Calibration

Empirical calibration was built using a suite of seven certified isooctane calibration standards to simulate gasoline.

Element: S Units: ppm		
Sample ID	Standard value	Calculated value
STD 1	5.0	5.1
STD 2	10.0	10.4
STD 3	15.0	14.5
STD 4	20.0	19.8
STD 5	25.0	25.1
STD 6	50.0	50.1



Precision

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

Element: S Units: ppm				
Sample	Standard value	Average value	Std. dev	% Relative
STD 2	10.0	9.71	0.20	2.0%
STD 5	50.0	50.2	0.47	0.9%

International standard test methods

The Rigaku NEX QC+ complies with ISO 13032 for the measurement of ultra- low sulfur between 8 – 50 mg/kg in diesel fuels and gasoline. NEX QC+ also complies with the following ASTM and international standard test methods for the measurement of sulfur up to 5% in various petroleum oils and fuels.

ASTM D4294	ISO 20847	ISO 8754	IP 496	IP 336	JIS K 2541-4
16 ppm - 5%	30 - 500 mg/kg	100 mg/kg - 5%	100 mg/kg - 5%	100 mg/kg - 5%	0.01 - 5%

Conclusion

The results shown here indicate the Rigaku NEX QC+ EDXRF analyzer gives excellent performance for the measurement of ULSD and ultralow sulfur gasoline in accordance with ISO 13032. The versatility of the NEX QC+ also makes it an ideal tool for the measurement of many other elements and oil matrices throughout the petroleum industry.

Related products



NEX QC Series

Combines quality, affordability, and performance for a wide range of applications