EDXRF Application Note
Sulfur in Fuel

#1535

SCOPE

On-line analysis of sulfur in fuel in the refining or blending process is demonstrated. Performance achieved meets the analytical requirements of ASTM-D4294-10.

BACKGROUND

On-line monitoring of the sulfur content of fuels in the refining or blending process is a critical step in insuring the end product meets specifications. Continuous monitoring allows for process optimization and minimizes lab testing requirements. The Rigaku NEX OL offers a simple and low maintenance on-line analytical technique for trending your processes. Results are communicated to your plant DCS (distributed control system) via 4-20 mA current loops or MODBUS over Ethernet connection allowing for real time closed loop control.

INSTRUMENTATION

Model:	Rigaku NEX OL Analyzer
Excitation:	Direct
X-ray tube:	50 kV 4 W Ag-anode
Detector:	Silicon Drift Detector
Atmosphere:	Air
Measurement Time:	300 sec

SAMPLE PREPARATION

Certified Reference Material was used to establish an empirical calibration. All samples were measured in a static position using the auxiliary sample input loop.

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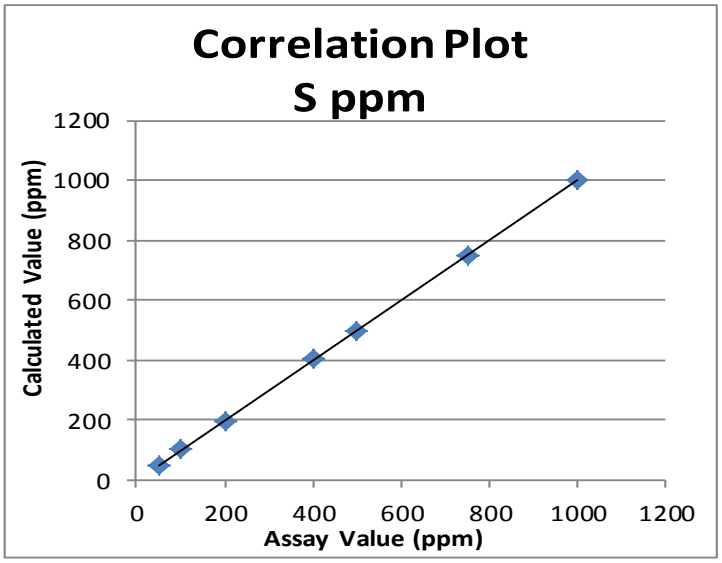
CALIBRATION

A simple linear empirical calibration was built using a suite of 7 certified calibration standards.

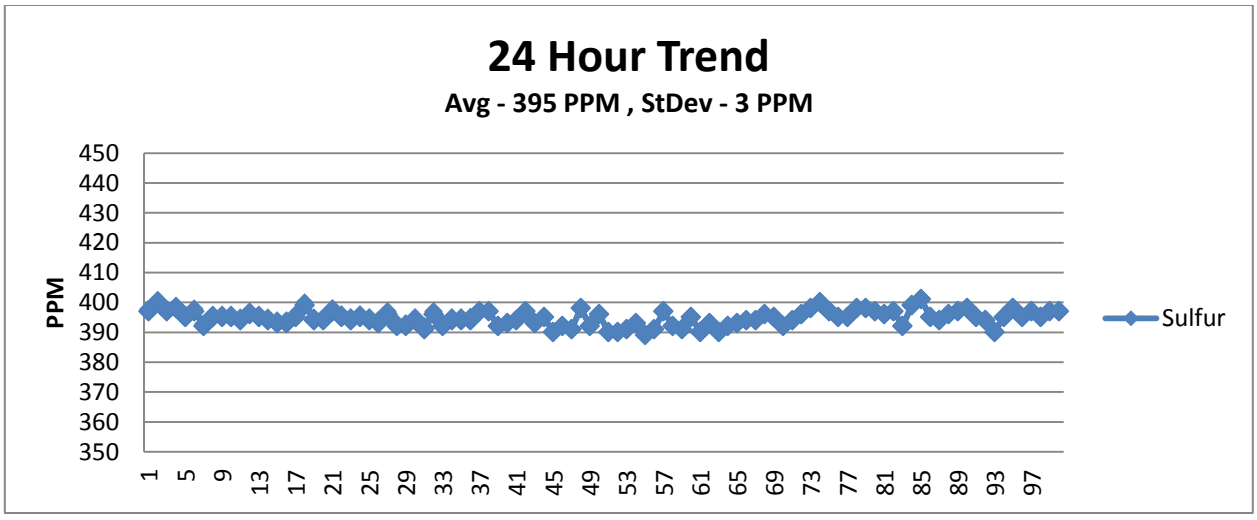
Element: S		SEE: 6.11
Units: ppm		R^2: 0.9997
Sample ID	Assay Value	Calculated Value
1	50	48
2	100	103
3	200	197
4	400	405
5	500	499
6	750	747
7	1000	1002



PRECISION

Instrument repeatability (precision) is determined by ten repeat analyses of a static sample using a 300 sec measurement time per analysis. Precision results are summarized here.

Element: S	Units: ppm		
Sample	Standard Value	Average Value	Std Dev
6	400	395	3



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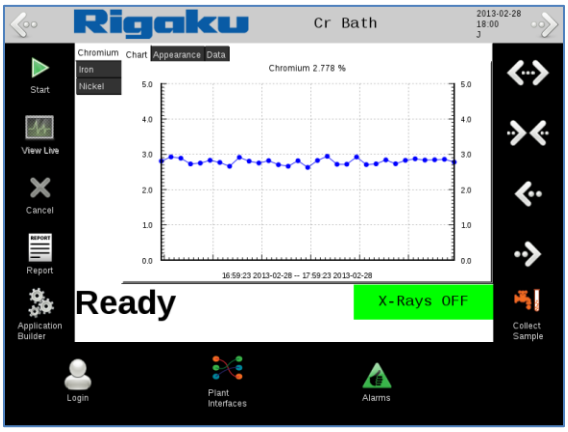
DETECTION LIMIT

Ten repeat analyses of a blank Mineral Oil sample were taken with the sample in a static position to determine the standard deviation. The Lower Limit of Detection (LLD) is then defined as three times the standard deviation.

Element	Empirical LLD ppm	Measurement Time
S	4.3	300 sec

NEX OL FEATURES & BENEFITS

- Real-time process control
- Trend analysis charting
- Capable of measuring elements Al to U, depending on application
- 50 kV X-ray tube excitation source with high resolution and count rate Si Drift Detector (SDD) technology
- Industrial touch screen user interface
- Unique tool less flow cell design
- 4-20 mA or MODBUS over Ethernet results reporting



CONCLUSION

The Rigaku NEX OL offers real time trend analysis in a simple yet powerful system. Quantification of your fuel stream can now be made on-line according to ASTM D4294-10.

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