NEX QC SERIES

Petroleum analysis by X-ray fluorescence

EDXRF elemental analyzers

Rigaku

Applied Rigaku Technologies, Inc.

New ASTM D4294 sulfur-in-oil analyzer from Rigaku combines established functionality with unmatched versatility

Sulfur will always be an important element in crude oils and fuels oils. Sulfur content is regulated in many products, and plays an important role in fuel quality and control of polluting emissions. Around the world, regulations are limiting the amount of sulfur allowable in diesel fuels, kerosene, heating oils, etc., thus affecting the price and quality of crude oil based on its sulfur content.

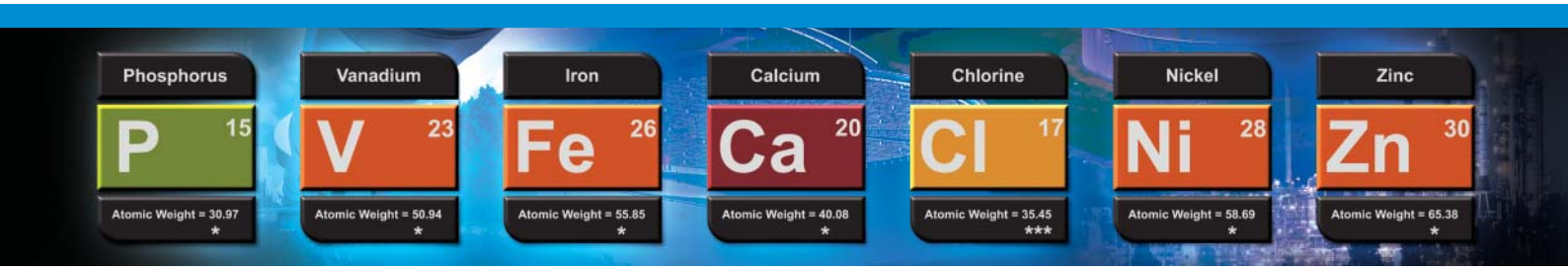
Reliably characterizing the sulfur content of crudes ensures proper quality for the various feedstocks at the refinery, and optimum blending ratios when combining different crudes to meet a desired sulfur concentration. Monitoring sulfur is also very important when characterizing other similar oils, like residual oils and bunker fuels. To meet the needs of the industry, Rigaku offers NEX QC series, simple and versatile benchtop EDXRF analyzers for the analysis of sulfur and other elements in crude oil, petroleum oils and fuels.

Modern design and functionality

As premium low cost benchtop Energy Dispersive X-ray Fluorescence (EDXRF) analyzers, the Rigaku NEX QC series deliver compliance with ASTM D4294 with an easy-to-learn software interface in a robust package specifically designed for the petroleum industry. Optimized for routine determination of sulfur in oil, the Rigaku NEX QC series feature an intuitive and modern "icon-driven" touch screen for easy operation and a built-in thermal printer for convenience.

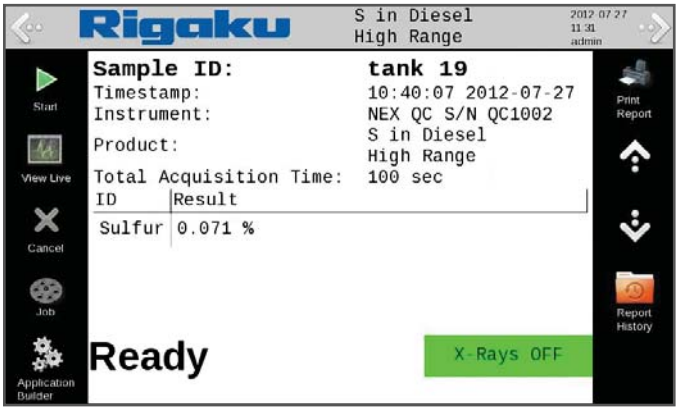
Up-to-date X-ray source/detector

A 50 kV X-ray tube and Peltier cooled semiconductor detector deliver exceptional short-term repeatability and long-term reproducibility, with excellent element peak resolution. The high voltage, along with multiple automated X-ray tube filters, provides multi-element analysis capability for unmatched performance with low limits-of-detection (LOD).

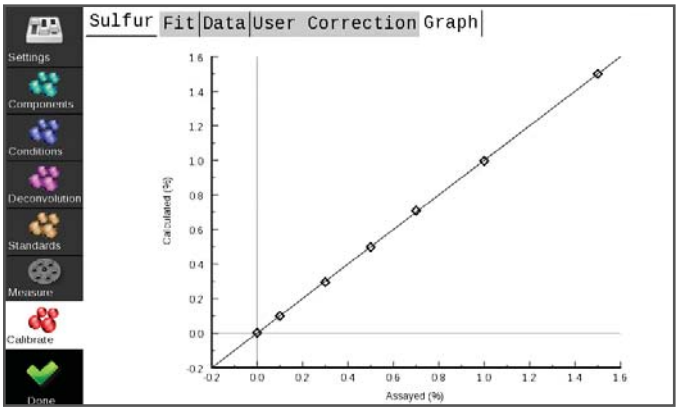


Computational dexterity

In addition to being remarkably easy to use, the Rigaku NEX QC series sulfur analyzers are powered by sophisticated software. Empirical calibration curves may be linear, quadratic or hyperbolic fits. To compensate for the presence of other elements in oil, intensity-based or concentration-based alpha (α) corrections may be enabled. C/H correction is also available to compensate for light element matrix changes in the oil and/or the presence of low atomic number (low-Z) additives and contaminants. All calibration functions are accessible via intuitive icons and with the touch of a finger.



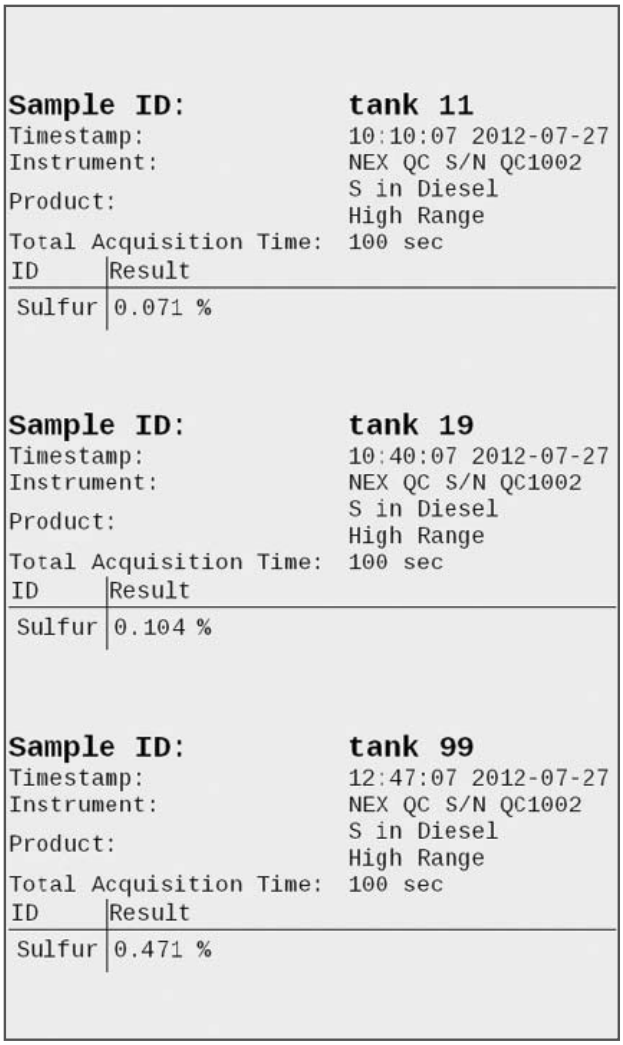
Instrument status, spectra, and analytical results are icon selectable with the touch of a finger



Calibration curves and statistics are accessible with familiar smartphone style interface

Backed by Rigaku

Since its inception in 1951, Rigaku has been at the forefront of analytical and industrial instrumentation technology. Today, with hundreds of major innovations to our credit, the Rigaku Group of Companies are world leaders in the field of analytical X-ray instrumentation. Rigaku employs over 1,400 people worldwide in operations based in Japan, the U.S., Europe, South America and China.



Sample ID: tank 11
Timestamp: 10:10:07 2012-07-27
Instrument: NEX QC S/N QC1002
Product: S in Diesel High Range
Total Acquisition Time: 100 sec

ID	Result
Sulfur	0.071 %

Sample ID: tank 19
Timestamp: 10:40:07 2012-07-27
Instrument: NEX QC S/N QC1002
Product: S in Diesel High Range
Total Acquisition Time: 100 sec

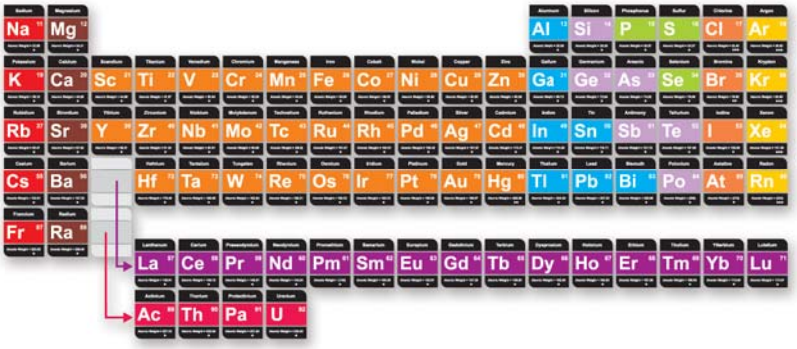
ID	Result
Sulfur	0.104 %

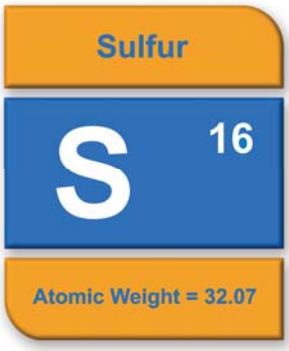
Sample ID: tank 99
Timestamp: 12:47:07 2012-07-27
Instrument: NEX QC S/N QC1002
Product: S in Diesel High Range
Total Acquisition Time: 100 sec

ID	Result
Sulfur	0.471 %

Paper copies of analytical results are conveniently available from the front mounted thermal printer

Analyze for sulfur plus other elements





Touch screen interface

High-resolution, modern, user-friendly touch screen navigation and instrument control.

Accepts standard XRF cups

No special cups needed. Use industry standard Chemplex™, Spex™, VHG™ or Premier™ cups.

Up to 38 calibrations

A large number of calibrations is available, at the touch of a finger, to support a vast array of applications and sample types.

Built-in printer

Thermal printer provides fast hard copy results when and where you need them.

X-ray tube conservation

By operating only during data collection, X-ray tube wear and tear is minimized.

C/H correction

Correction is available to compensate for calibration error caused by different types of oil.

Detector protection mechanism

An easily changeable plastic film is positioned in between the detector and the sample holder to protect the instrument in the event of leaks or spills.

Single position sample holder showing "easy snap" leak protection mechanism

NEX QC

5 ppm sulfur (S) detection limit

ASTM D4294 method is met for diesel oil as analyzed in air. Repeatability is ±3.4 ppm at 100 ppm with a 120 s measurement in air.

NEX QC+

1.3 ppm sulfur (S) detection limit

ISO 13032 method is met for diesel oil as analyzed in helium atmosphere. Repeatability is ±0.5 ppm at 10 ppm with a 300 s measurement in helium.

Digital data output

Ethernet RJ-45 jack and USB port for output to LIMS or memory stick. Data is available in either CSV or PDF formats.

Single position or autosampler

Standard single position configuration can be supplemented with an optional autosampler.

Removable sample trays

Interchangeable optional autosampler trays may be pre-loaded, or swapped in and out, to increase efficiency or where throughput is important. Supports 32 mm and 40 mm cups.

ASTM D4294 method for sulfur

International test methods

For the determination of traditional levels of sulfur (S) in crude, bunker fuel, diesel and other petroleum raw materials and refined products, the Rigaku NEX QC series offer compliance for:

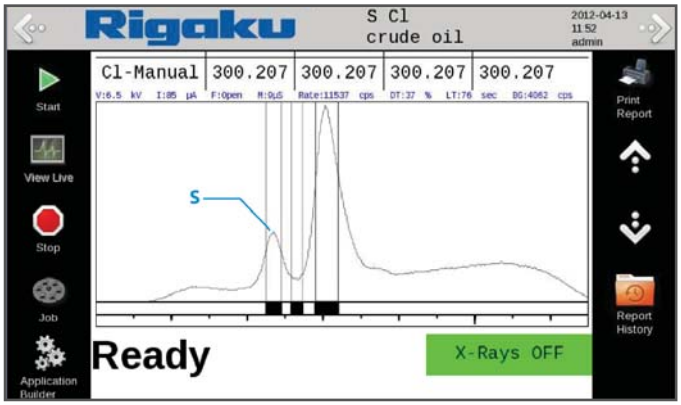
- **ASTM D4294-10:** 16 ppm – 5wt%
- **ISO 20847:** 30 – 500 mg/kg
- **ISO 8754:** 100 mg/kg – 5wt%
- **IP 496:** 100 mg/kg – 5wt%
- **IP 336:** 100 mg/kg – 5wt%
- **JIS K 2541-4:** 0.01 – 5wt%
- **ISO 13032:** 8 – 50 mg/kg (NEX QC+ only)

The versatility and performance of the Rigaku NEX QC series is also demonstrated by the ability to perform other petroleum related applications like multiple elements (P, S, Ca, Zn, and Ba) in lubricating oils and Pb in gasoline.

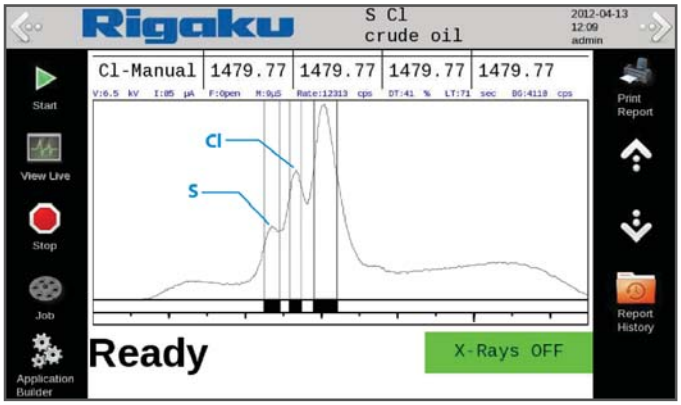
- **ASTM D6481**
- **ASTM D5059**

Multi-element versatility

Rigaku NEX QC series analyzers are capable of measuring more than just sulfur. Multi-element analysis is important for detecting crude oil contamination or adulteration by the presence of salt and other chlorine-bearing compounds. Left undetected, the presence of Cl can bias the S reading high, and potentially leave the presence of Cl unnoticed. The NEX QC series analyzers have the ability to detect Cl and other elements, and correct for the presence of Cl so that it does not bias the S reading.



Sweet crude 0.5% S containing no Cl



Sweet crude oil contaminated with Cl. Unnoticed and uncorrected, Cl will bias the sulfur reading high

Specifications

Excitation
50 kV X-ray tube
4 W max power
6 tube filter positions

Detection
High performance semiconductor detector
Peltier thermo-electric cooling
Optimum balance of spectral resolution and count rate

Sample chamber
Large 190 x 165 x 60 mm sample chamber
Single position 32 mm sample aperture
Single position 40 mm sample aperture
Bulk sample aperture
6-position 32 mm automatic sample changer
5-position 40 mm automatic sample changer
Analysis in air or helium

Software
Qualitative and quantitative analysis
Normalization and validation feature
Data export function with LIMS compatibility
User selectable shaping times
Simple flow bar wizard to create new applications
Icon driven graphical user interface
Password protection
Multi-language

Environmental conditions
Ambient temperatures 10 – 35°C (50 – 95°F)
Relative humidity <85% non condensing
Vibration undetectable by human
Free from corrosive gas, dust, and particles

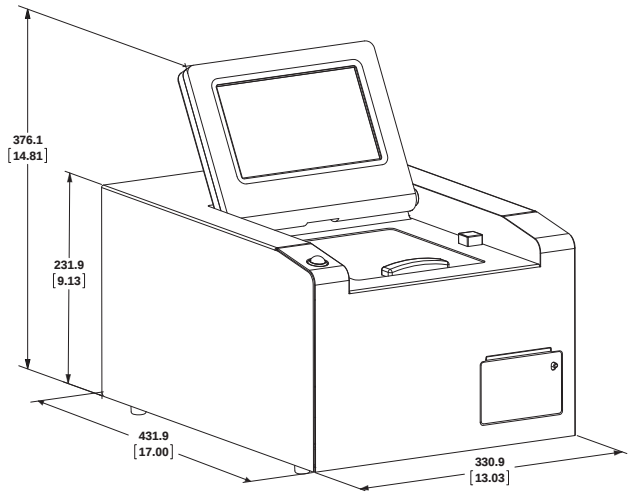
User interface
8" WVGA touch screen interface
Embedded computer
Internal thermal printer
USB and ethernet connections

Sample changer configuration

Single position configuration

Options
6-position 32 mm automatic sample changer
5-position 40 mm automatic sample changer
Pre-calibrated Sulfur-Paks
Calibration standards
Helium purge

Spectrometer data	
Single phase AC	100/240 V, 1.4 A (50/60 Hz)
Dimensions:	331 (W) x 432 (D) x 376 (H) mm (13 x 17 x 14.8 in)
Weight:	16 kg (35 lbs.)



www.RigakuEDXRF.com

Applied Rigaku Technologies, Inc.
9825 Spectrum Drive, Bldg. 4, #475, Austin, TX 78717 USA
phone: +1-512-225-1796 | fax: +1-512-225-1797
website: www.RigakuEDXRF.com | email: info@RigakuEDXRF.com

Rigaku Corporation and its Global Subsidiaries
website: www.Rigaku.com | email: info@Rigaku.com

NEX QC SERIES

Petroleum analysis by X-ray fluorescence

1002166 NEX QC Petro_brochure_en_Ver4_2017.03.08