Online Sulfur and Metals Analysis in Streams

Crude oil naturally contains varying levels of sulfur and metals like nickel, vanadium, and iron, which can negatively impact refining processes. As regulations tighten and demand for sweeter crudes rises, refiners are seeking cost-effective oils with minimal impurities. Powered by HDXRF®, Petra MAX Online leverages ASTM D4294 and D8252 technology to provide real-time, continuous analysis of total sulfur, nickel, vanadium, and iron. Designed for hazardous area locations, this process analyzer is NEC Class I Division 2 certified.

APPLICATIONS

- Refinery: feedstock and intermediate quality monitoring, hydroprocessing, and blending processes
- Pipeline terminals: interface cuts, custody transfer acceptance, and tank contamination prevention

FEATURES

- Limits of detection (at 300 s measurement time)
  S 20 ppm Ni 0.1 ppm
  V 0.2 ppm Fe 0.1 ppm
- Uses ASTM D4294 and D8252 technology
- NEC Cl I Div 2 Certified
- Robust industrial design: wall-mounted or standalone
- Large, 15”/28 cm, easy to use touchscreen interface

BENEFITS

- Continuous, real-time analysis
- Rapid response to upsets
- Low maintenance: no consumable liquids, gasses, combustion, or sample conversion
- Not sensitive to sample temperature changes

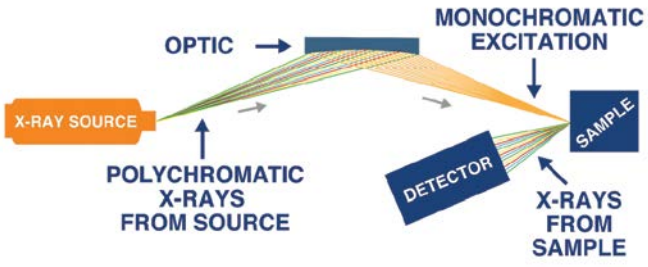
Petra MAX ONLINE
Elemental Analyzer for Petroleum

NEC Certified

ADVANCED ANALYSIS WITH HDXRF

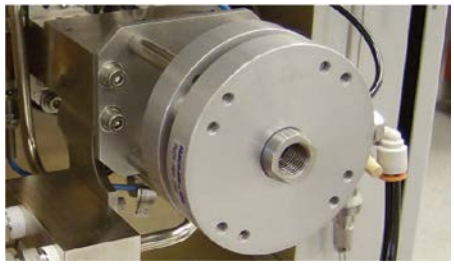
Petra MAX Online is powered by High Definition X-ray Fluorescence (HDXRF) technology, an elemental analysis technique offering significantly enhanced detection performance over traditional XRF technology. This technique applies state-of-the-art monochromating and focusing optics, enabling dramatically higher signal-to-background ratio compared to traditional polychromatic X-ray Fluorescence. **Figure 1** shows the basic configuration of HDXRF and its use of focused monochromatic excitation.

Figure 1



VISCOSITY AND SAMPLE CONDITIONING

Petra MAX Online can measure most crude oil streams with a maximum viscosity limitation of 160 cSt at 70°F (1.6 cm^2/s at 21°C). More viscous materials can be analyzed by increasing sample temperature up to 275°F. A 100-micron self-cleaning bypass flow style filter or inline filter assembly is recommended. The analyzer is generally insensitive to water content in the crude oil.



HIGH VISCOSITY DYNAMIC WINDOW MODULE

The High Viscosity Dynamic Window Module (HV-DWM) ensures stable and accurate test results independent of sample matrix. The HV-DWM automatically, and at pre-programmed intervals, positions a new and robust window material in the measurement area. As a result, the measurement is stable, and drift caused by contamination buildup is eliminated. The HV-DWM uses an X-ray transparent polyimide film allowing stream pressures up to 80 psi (550kPa). While the sample stream flows continuously through the HV-DWM, the sample analysis takes place continuously as well, ensuring rapid and highly representative monitoring of the sample stream.

PRODUCT SPECIFICATIONS

Analytical Platform	HDXRF
Response Time	300 s
Calibration	Fundamental Parameters and 3-5 point linear calibration curve
Data Communication	Multiple 4-20 mA analog outputs, one per element; discrete alarm output(s)
Digital Communication	Modbus TCP, Optional – Modbus RS-232 or Modbus RS-485 (half or full duplex)
Local HMI	15"/ 38 cm touchscreen display
Power	110-240 VAC, 50-60 Hz, 750 W max
Instrument Air - Purge and Valve	60-115 psig, (414-793 kPa) 4 scfm max; -40 F (-40 C) dewpoint, oil free, N2 optional
Ambient Temperature	32-95 F (0-35 C) Standard; -4 to 113 F (-20 to 45 C) Optional - consult factory
Dimensions	60 in (h) x 38 in (w) x 18 in (d) / 152 cm (h) x 97 cm (w) x 46 cm (d)
Weight	300 lbs (136 kg)
Certifications	CE, NEC Class I Div 2 Groups B,C,D T4A

1.518.880.1500 • info@xos.com • xos.com