



Sulfur Process Analyzer for Petroleum Fuels

SINDIE[®]

On-Line Analyzer



KEY FEATURES

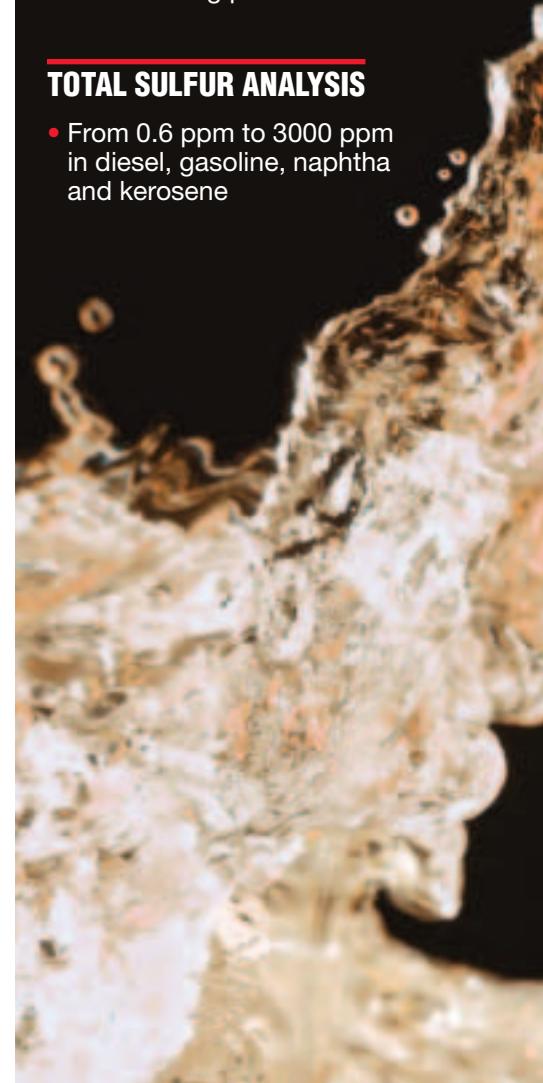
- Total sulfur determination by MWD XRF
- Dynamic range from 0.6ppm to 3000 ppm
- Measurement time: 30 seconds to 5 minutes, user programmable
- No consumables, gases or high temperature processes
- Extremely low maintenance
- Modular design for plug-and-go operation
- Also available in bench-top format

USAGE

- Pipeline terminals: interface cuts and tank contamination prevention
- Refinery: hydrotreating, hydrofiner and blending processes

TOTAL SULFUR ANALYSIS

- From 0.6 ppm to 3000 ppm in diesel, gasoline, naphtha and kerosene



SINDIE® On-Line Sulfur Analysis in Petroleum Fuels

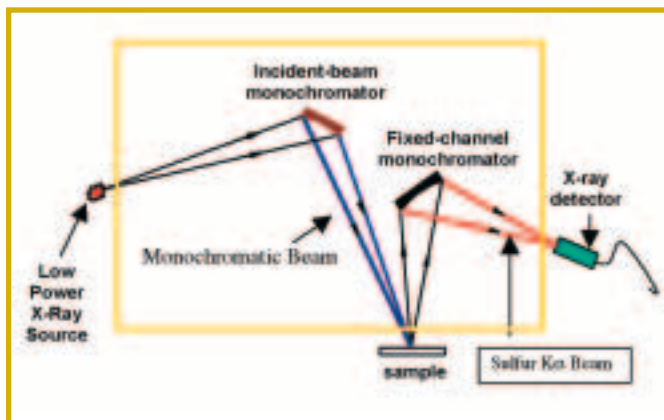
The SINDIE® On-Line Analyzer is an industrial grade process sulfur analyzer with breakthrough detection capability for monitoring fuels streams as exacting as ultra low sulfur diesel and gasoline. This process analyzer presents the ultimate solution for Pipeline Terminals, where measurement speed, and reliability are essential. The breakthrough Monochromatic Wavelength Dispersive X-Ray Fluorescence technique of the SINDIE® On-Line Analyzer offers a Limit Of Detection (LOD) of 0.6 ppm, and a dynamic range from 3000 ppm. This direct and non-destructive measurement technique does not require sample conversion or consumable gases and does not involve high temperature operations. The result: a robust process analyzer with minimal maintenance and unprecedented detection capability and measurement speed.

MWD XRF Technology

Monochromatic Wavelength Dispersive X-Ray Fluorescence (MWD XRF) analysis provides dramatically improved S/B over conventional XRF techniques, in a compact and simplified on-line configuration. The improved S/B is achieved by eliminating the scattering of bremsstrahlung from the x-ray source.

The configuration of a MWD XRF unit is shown in Figure 1. It consists of an x-ray source, a point-focusing optic for excitation, a sample cell, a focusing optic for collection and an x-ray detector. In this system, the first-point focusing optic captures a narrow bandwidth of x-rays from the source and focuses an intense monochromatic beam in a small spot on the fuel cell. The monochromatic primary beam excites the sample and secondary characteristic fluorescence x-rays are emitted. The second collection optic collects only the characteristic sulfur x-rays which are then focused onto the detector.

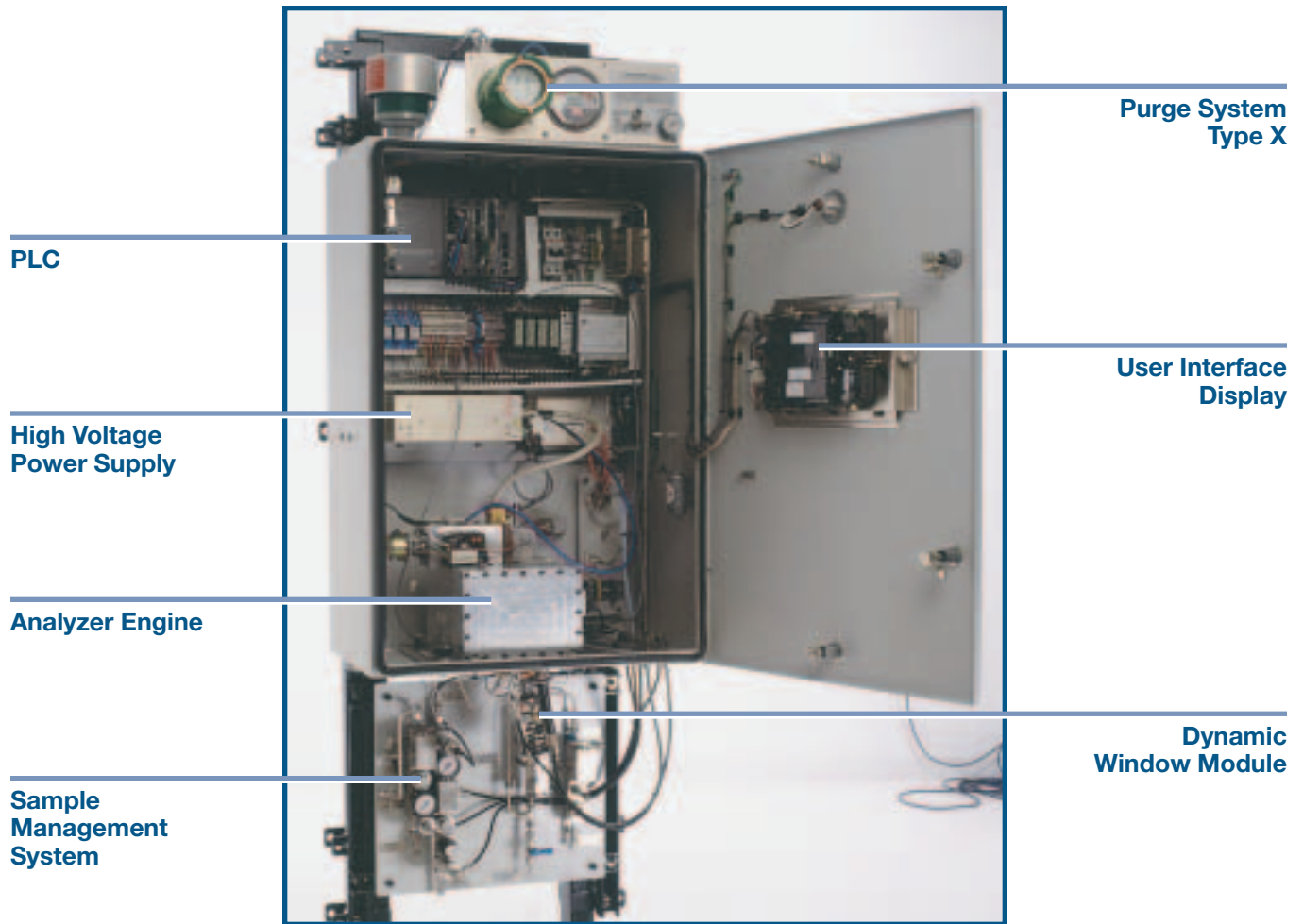
FIGURE 1
Analytic Engine Configuration



- Monochromatic excitation = Extremely high S/B
- Compact and modular analyzer engine design
- No moving parts in analyzer engine
- No consumables or sample conversion required
- Simplified matrix correction

FEATURES AND BENEFITS:

- Excellent detection capability: LOD: 0.6 ppm
- Dynamic range from 0.6 ppm – 3000 ppm sulfur
- Continuous monitoring with programmable response times:
 - 30 seconds: ideal for pipeline interface cuts
 - 5 minutes: for most demanding refinery processes
- Direct measurement without sample conversion Analysis in ppm (wt)
- No density conversion needed
- No consumable gasses required
- Extremely low maintenance: No heating elements No quartz tubing No columns
- Dynamic window module design is operator independent and ensures measurement stability
- Robust industrial design: wall mounted or stand alone
- Outstanding linearity: One calibration curve for diesel and gasoline matrixes, over full dynamic range
- Compact footprint 24" w x 17" d x 65" h



Product Specifications	
Electrical	Input voltage: 115 VAC, +/- 10%, <300V peak-to-peak max. transient Input frequency: 57-63 Hz Requires 15 amp, dedicated circuit with disconnect 1" MPT in explosion-proof enclosure for X-Purge
Purge	Instrument Air or Dry Nitrogen 6 scfm @ 60 psig min. for normal operation 12 scfm during initial purge cycle (5 minutes at 75 psi) Connections: (1) 3/8" SST tubing
Fuel Sampling System Included	Inlet: 0.03-3.0 GPM: 10-90 psig Outlet: 0.03-3.0 GPM: 0-70 psig Conventional or in NeSSI format
Ambient Temperature	0-40°C (40-104°F)
Size and Weight	24"w x 17"d x 65"h 180 lbs.
Communication	RS 485 cable to lab or control room display interface Ethernet cable for phone modem interface 4-20mA output proportional to sulfur concentration Explosion-proof screen interface Remote diagnostics capability
Sample Conditioning Systems	<i>Optional:</i> Sample pressure and flow regulators Particle and H ₂ O removal
Classification	Class 1, Division 1, Groups C-D, X Purge Class 1, Division 2, Groups C-D, Z Purge

Sample Data

FIGURE 2
Linear Calibration
0-500 ppm

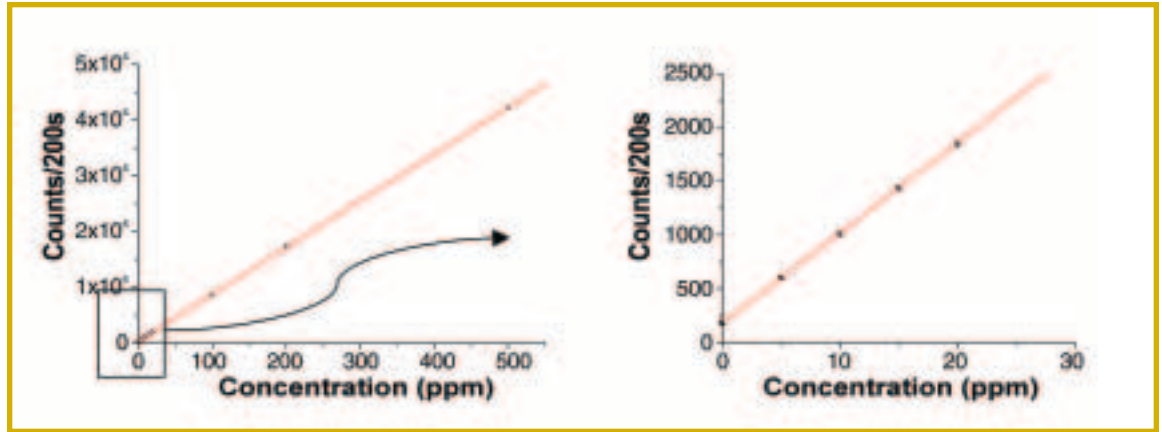
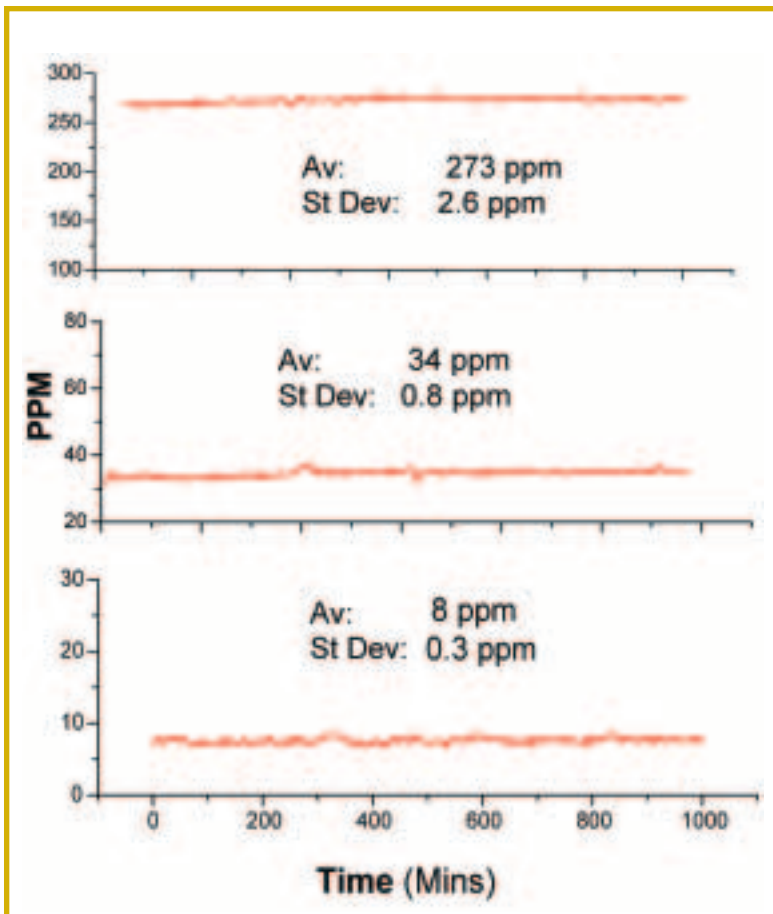


FIGURE 3
On-Line Monitoring of Diesel Fuels at Various Sulfur Levels



Repeatability	
S Concentration	Standard Deviation
1 ppm	0.1 ppm
10 ppm	0.4 ppm
100 ppm	1.3 ppm
500 ppm	3.0 ppm



Travel at the Speed of SINDIE®

15 Tech Valley Drive • East Greenbush, New York 12061, USA • 518-880-1500 • Fax: 518-880-1510
e-mail: info@xos.com • website: www.xos.com