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Sindie TURN•KEY Sulfur Analyzer

The SINDIE “Turnkey” Solution for Terminals, Pipelines and Refineries



KEY FEATURES

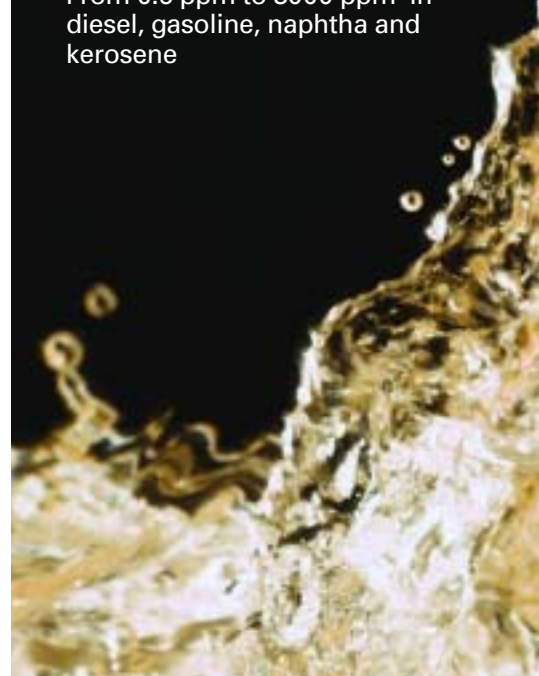
- Fully Integrated – On-Line Sulfur Analysis Solution – includes shelter, sample management and purge air supply
- Pre-engineered for rapid installation, robust operation & optimal results
- Continuous sulfur measurement - truly on-line (not “at-line”)
- Total sulfur by MWD-XRF – D 7039 “direct” measurement – no sample injection or combustion involved.
- Designed for terminals and pipelines
- Two (2) simultaneous outputs:
 - (~10 sec) Rapid measurements for determination of contamination and interface detection
 - (~300 sec) Precise measurements for regulatory protection and quality assurance

USAGE

- Pipelines
- Terminals
- Refiners
- Blending Applications

TOTAL SULFUR ANALYSIS

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



SINDIE® Sulfur Analysis in Petroleum Fuels

The SINDIE® Turnkey System is a fully integrated, environmentally tolerant industrial grade process sulfur analyzer with breakthrough detection capability for monitoring fuel streams as exacting as ultra low sulfur diesel, gasoline and process streams. This process analyzer presents the ultimate solution for pipelines, terminals and other installations, where measurement speed, and reliability are essential. The breakthrough Monochromatic Wavelength Dispersive X-Ray Fluorescence technique offers a Limit Of Detection (LOD) of 0.6 ppm, and a dynamic range of 3000 ppm. This direct and non-destructive measurement technique does not require sample conversion or consumable gases and avoids 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 Signal to Background over conventional XRF techniques, in a compact and simplified on-line configuration. The improved S/B is achieved by eliminating bremsstrahlung scattering.

The configuration of a MWD XRF unit is shown in Figure 1. It consists of an x-ray beam, 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 and focuses an intense monochromatic beam in a small spot on the sample 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.

A Typical Turnkey System:

- Environmental Enclosure Analyzer
- Sample Conditioner
- Air compressor
- Sample pump (optional)
- Sample Recovery (optional)
- Remote Diagnostics Hardware Package (optional)
- Wireless data transmission package (optional)

Sample Conditioner:

- Input Pressure Range 35-1300 PSI
- Modular Design for easy, fast maintenance
- Long lasting, self cleaning filtration system

Sample Recovery System:

- Tank Capacity 15 gallons
- Multi-level sensor warnings

Environmental Enclosure:

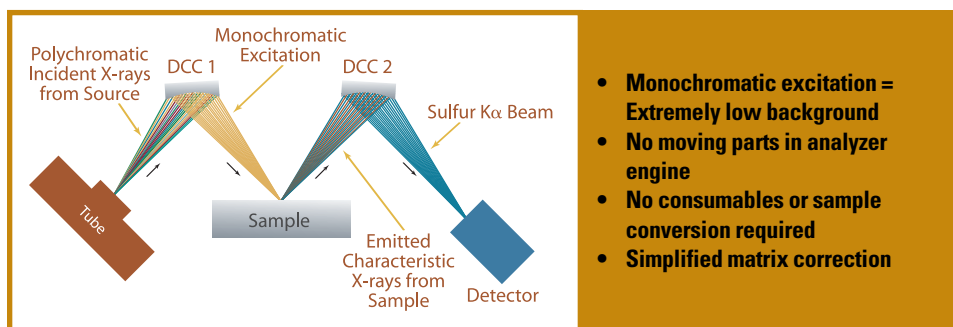
- Keeps out rain, snow, hail, wind, for easier maintenance
- Strong galvanized steel construction & interlocking wall & roof panels
- Lights provided for night work
- Alterable air intake vent height
- Lockable cabinets

FEATURES AND BENEFITS:

- Direct measurement without sample conversion
- Analysis in ppm (wt)
- Excellent detection capability: LOD 0.6ppm
- Dynamic range from 0.6 ppm – 3000ppm sulfur
- No density conversion needed
- No consumable gases required
- Extremely low maintenance:
 - No heating elements
 - No quartz tubing
 - No columns
- Dynamic window module design is operator independent and ensures measurement stability
- Pre-engineered for economical installation. Requires only pad site, utilities and sample connections.
- Outstanding linearity: One calibration curve for diesel and gasoline matrixes, over full dynamic range
- Eliminates on-site analyzer variables, e.g. sample pressure, flow, sample conditioning.
- Reduces maintenance and operational complexity.
- System optimization for terminal operations
- Broad environmental operating range
- System design maximizes fast response

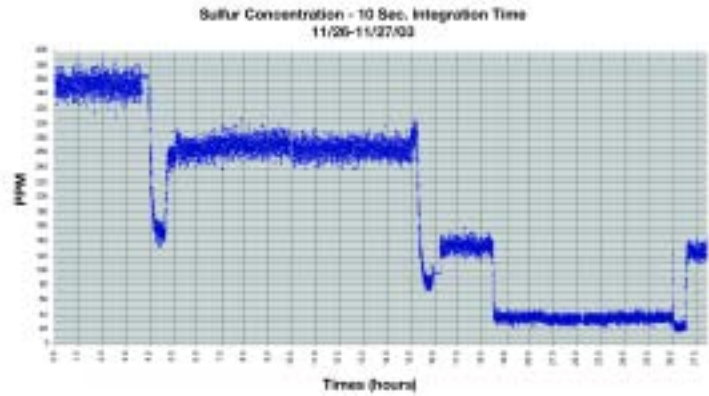
FIGURE 1

Analytic Engine Configuration

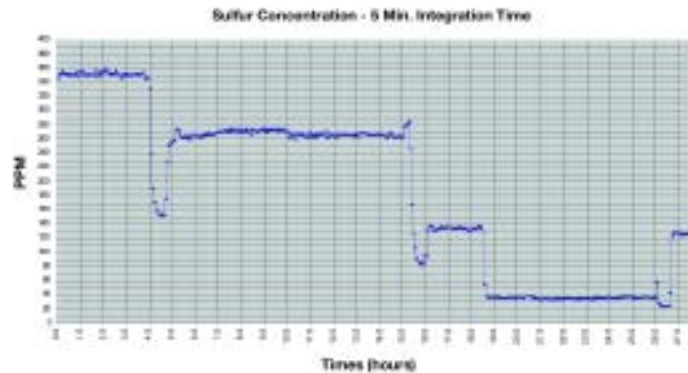


Pipeline Data

**10 Second
Analysis Time**



**5 Minute
Analysis Time**



PRODUCT SPECIFICATIONS

Electrical	<ul style="list-style-type: none"> • Input voltage: 120 VAC, to UL61010 (85% to 110%), <300V peak-to-peak max. transient • Input frequency: 60 Hz • Requires 15 amp, dedicated circuit with visible disconnect, maximum system current < 10 amps
Purge	<ul style="list-style-type: none"> • Instrument Air • 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	<ul style="list-style-type: none"> • Inlet: 35 to 1300 PSI • Fast loop flow: .25-5 GPM • Analyzer flow: 2-3 GPH
Ambient Temperature	<ul style="list-style-type: none"> • -20 to +50°C (-5 to +120°F)
Size and Weight	<ul style="list-style-type: none"> • 6' w x 5' d x 8.5' h • 2500 lbs.
Communication	<ul style="list-style-type: none"> • Modbus to control system • Ethernet for phone modem interface or PC diagnostic capability • 4-20mA output proportional to sulfur concentration • Class I Div 2 Touchscreen interface
Sample Conditioning Systems	<p>Optional:</p> <ul style="list-style-type: none"> • Sample pressure and flow regulators • Particle and H2O removal
Classification	<ul style="list-style-type: none"> • Class I, Division 2, Groups B,C,D; Z Purge

Sample Data

FIGURE 2

Linear Calibration
0-500 ppm

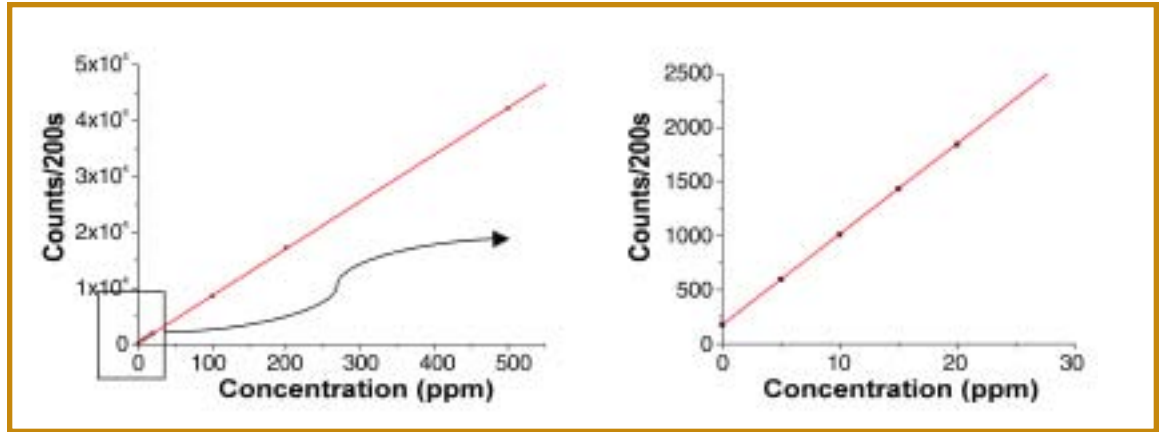
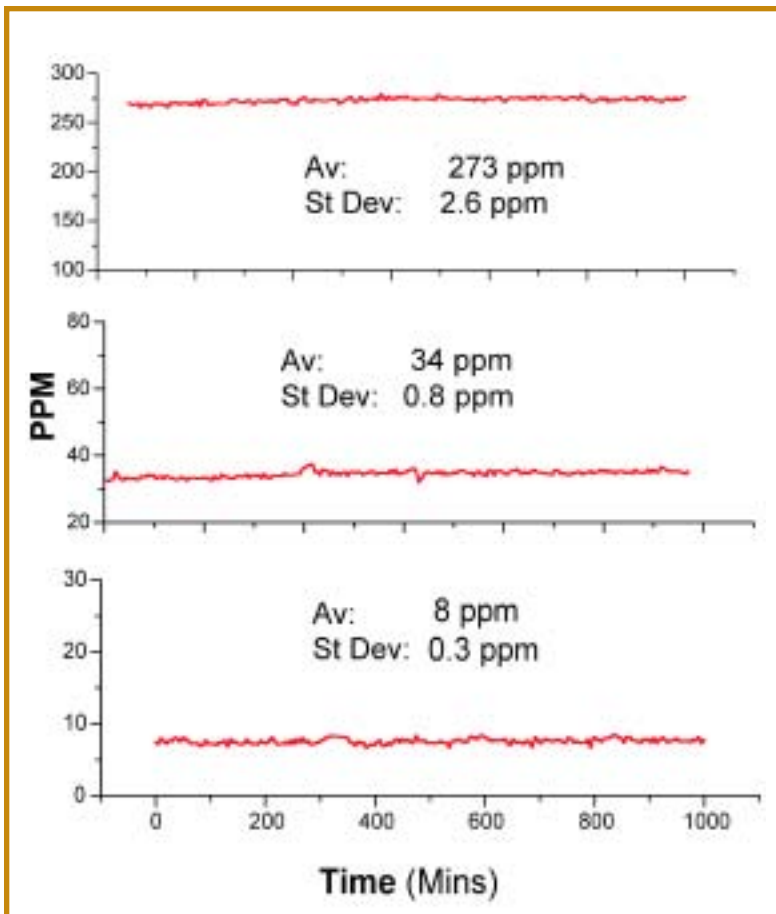


FIGURE 3

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



Better Analysis Counts

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