

# Certify Sulfur and Monitor Critical Elements at Sub-ppm Levels



# Sulfur Measurement Advanced

The Petra series delivers high-precision D4294 sulfur analysis across a broad measurement range. Petra MAX™ delivers D4294 sulfur analysis in addition to 12 elements from P to Zn, for rapid monitoring of critical elements like Ca, Fe, K, Ni, and V at sub-ppm levels.

**Petra**MAX  
Elemental Analyzer for Petroleum

**Petra**4294  
Sulfur Analyzer for Petroleum



TECHNICAL SPECIFICATIONS							
Petra MAX	Dynamic Range	Sulfur 5.7 mg/kg (ppm) – 10 wt%					
	Limit of Detection mg/kg (ppm) @ 600 s	Sulfur 5.7 mg/kg (ppm)					
		P	Cl	K	Ca	V	Cr
		17	3	0.7	0.4	0.1	0.09
		Mn	Fe	Co	Ni	Cu	Zn
	0.07	0.07	0.07	0.04	0.1	0.1	
	Applications	Hydrocarbons, water and catalysts					
Petra 4294	Dynamic Range	Sulfur 2.6 mg/kg (ppm) – 10 wt%					
	Limit of Detection (ppm @ 600 s)	Sulfur 2.6 mg/kg (ppm)					
	Applications	Hydrocarbons, Water					

Petra is powered by High Definition X-ray Fluorescence (HDXRF®) technology: an elemental analysis technique offering significantly enhanced detection performance over traditional XRF technology.

## Advanced Workflow

Petra Series Autosampler boasts a novel design with advanced software features for a more flexible and efficient workflow. Using unique identifier (X-ID) sample cups and an open-ended sample slide, the autosampler offers sample tracking and continuous sample loading. It is an optional add-on feature for a Petra 4294 or Petra MAX analyzer. QR/barcode scanner included with purchase.



**X-ID**  
Sample Cup

ASTM D4294  
ISO 8754 | IP 336

# Analyze Sulfur with Unparalleled Precision at a Competitive Price

Easier to use than ever, Sindie R1 is the ideal sulfur analysis solution to help you stay in compliance with ASTM D2622, ASTM D7039, ISO 20884, and EN 16997 methods, enabling flexibility for your analytical needs at a more affordable price.\*

## APPLICATIONS

- Petroleum products (diesel, jet, kerosene, other distillate oil, naphtha, residual oil, lubricating base oil, hydraulic oil, crude oil, gasoline, gasoline-ethanol blend, coal and petroleum cokes)
- First and second-generation biofuels (biodiesel, ethanol, renewable diesel, HVO, SAF)
- Oils (edible) and fats (UCO, Tallow, palm oil, corn oil, soybean oil, etc.)
- Chemicals (toluene, xylene, methanol, benzene etc.)
- Water

## FEATURES AND BENEFITS

- **LOD:** 0.7 mg/kg (ppm) at 300s, 0.5mg/kg (ppm) at 600s\*\*
- **Dynamic range:** 0.7 mg/kg (ppm) to 10 wt%
- Easy to use
  - Intuitive 10-inch touch screen
  - Just plug in and measure
  - Measurement time: 10-999 s
- Low and high range available:
  - **Low range:** 0.7 mg/kg (ppm) – 3000 mg/kg (ppm)
  - **High range:** 0.3 wt% – 10 wt%
- **Low maintenance:** no gasses, heating elements, columns, or quartz tubing
- Traditional 43 mm XRF sample cups or XOS Accucells – decided at time of order
- Small footprint
- LIMS integration for data management and transfer
- Custom sample presets to save data entry time and minimize data entry error on common samples
- Bar code reader autofills sample name to reduce data entry time
- Storage capacity for more than 50,000 measurement results
- Supports up to 30 calibration curves
- USB connectivity in front and back for connecting to printer, keyboard, mouse, and memory stick
- Supports USB and network printers
- Large, easy-to-remove side panels for easy serviceability
- Advanced error reporting and diagnostics

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**Sindie** **R1**  
Sulfur Analyzer  
The R Series



ASTM D7039 , ASTM D2622,  
ISO 20884, EN 16997

\*All qualification herein are subject to user guide specifications. If you have further questions, reach out to our team of experts at [info@xos.com](mailto:info@xos.com).

\*\*Longer cycle time increases counts and lower LOD, but sample conditions over time must be considered. For further inquiries, please contact us at [info@xos.com](mailto:info@xos.com).

# Analyze Sulfur with Precision and Flexibility

Easier to use than ever, Sindie R2 provides the best value and combination of detection limits, measurement speed, ease of use and reliability. Sindie R2 is the ideal sulfur analytical solution to help you stay in compliance with ASTM D2622, ASTM D7039, ISO 20884, and EN 16997 methods, enabling complete flexibility for your analytical needs.\*

## APPLICATIONS

- Petroleum products (diesel, jet, kerosene, other distillate oil, naphtha, residual oil, lubricating base oil, hydraulic oil, crude oil, gasoline, gasoline-ethanol blend, coal and petroleum cokes)
- First and second-generation biofuels (biodiesel, ethanol, renewable diesel, HVO, SAF)
- Oils (edible) and fats (UCO, Tallow, palm oil, corn oil, soybean oil, etc.)
- Chemicals (toluene, xylene, methanol, benzene, etc.)
- Water

## FEATURES AND BENEFITS

- **LOD:** 0.4 mg/kg (ppm) at 300s, 0.28 mg/kg (ppm) at 600s\*\*
- **Dynamic range:** 0.4 mg/kg (ppm) to 10 wt%
- Easy to use
  - Intuitive 10-inch touch screen
  - Just plug in and measure
  - **Measurement time:** 10-999 s
- Low and high range available:
  - **Low range:** 0.4 mg/kg (ppm) – 3000 mg/kg (ppm)
  - **High range:** 0.3 wt% - 10 wt%
- **Low maintenance:** no gasses, heating elements, columns, or quartz tubing
- Traditional 43 mm XRF sample cups or XOS Accucells – decided at time of order
- Small footprint
- LIMS integration for data management and transfer
- Custom sample presets to save data entry time and minimize data entry error on common samples
- Bar code reader autofills sample name to reduce data entry time
- Storage capacity for more than 50,000 measurement results
- Supports up to 30 calibration curves
- USB connectivity in front and back for connecting to printer, keyboard, mouse, and memory stick
- Supports USB and network printers
- Large, easy-to-remove side panels for easy serviceability
- Advanced error reporting and diagnostics



**The R Series**



**ASTM D7039 , ASTM D2622,  
ISO 20884, EN 16997**

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# Analyze Sulfur with Unparalleled Precision

Easier to use than ever, Sindie R3 is our most advanced sulfur analytical solution for compliance with ASTM D2622, ASTM D7039, ISO 20884, and EN 16997 methods, enabling complete flexibility for your analytical needs. Advanced R3 optics, provide extremely low limits of detection, allowing for cycle time flexibility to save up to hours per day in testing time.\*

## APPLICATIONS

- Petroleum products (diesel, jet, kerosene, other distillate oil, naphtha, residual oil, lubricating base oil, hydraulic oil, crude oil, gasoline, gasoline-ethanol blend, coal and petroleum cokes)
- First and second-generation biofuels (biodiesel, ethanol, renewable diesel, HVO, SAF)
- Oils (edible) and fats (UCO, Tallow, palm oil, corn oil, soybean oil, etc.)
- Chemicals (toluene, xylene, methanol, benzene, etc.)
- Water

## FEATURES AND BENEFITS

- **LOD:** 0.18 mg/kg (ppm) at 300s, 0.15 mg/kg (ppm) at 600s\*\*
- **Dynamic range:** 0.18 mg/kg (ppm) to 10 wt%
- Advanced R3 optics allow for optional lower background measurement time
- Easy to use
  - Intuitive 10-inch touch screen
  - Just plug in and measure
  - Measurement time: 10-999 s
- Low and high range available:
  - **Low range:** 0.18 mg/kg (ppm) – 3000 mg/kg (ppm)
  - **High range:** 0.3 wt% - 10 wt%
- **Low maintenance:** no gasses, heating elements, columns, or quartz tubing
- Traditional 43 mm XRF sample cups or XOS Accucells – decided at time of order
- Small footprint
- LIMS integration for data management and transfer
- Custom sample presets to save data entry time and minimize data entry error on common samples
- Bar code reader autofills sample name to reduce data entry time
- Storage capacity for more than 50,000 measurement results
- Supports up to 30 calibration curves
- USB connectivity in front and back for connecting to printer, keyboard, mouse, and memory stick
- Supports USB and network printers
- Large, easy-to-remove side panels for easy serviceability
- Advanced error reporting and diagnostics



**The R Series**



**ASTM D7039 , ASTM D2622,  
ISO 20884, EN 16997**

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# TWO Critical Measurements, ONE button, ZERO Hassle

Sindie +Cl® is a two-in-one instrument enabling trace analysis of both sulfur and chlorine with one push of a button. It is the ideal solution to certify sulfur levels in finished products, assess chlorine for corrosion mitigation, and optimize process parameters.\*

## APPLICATIONS

- Total sulfur analysis from ultra low sulfur fuels to crudes
- Total chlorine analysis from aqueous solutions and aromatic products to heavy fuels, and crudes
- For use in refinery labs, pipeline terminals, additive plants and inspection laboratories

## FEATURES AND BENEFITS

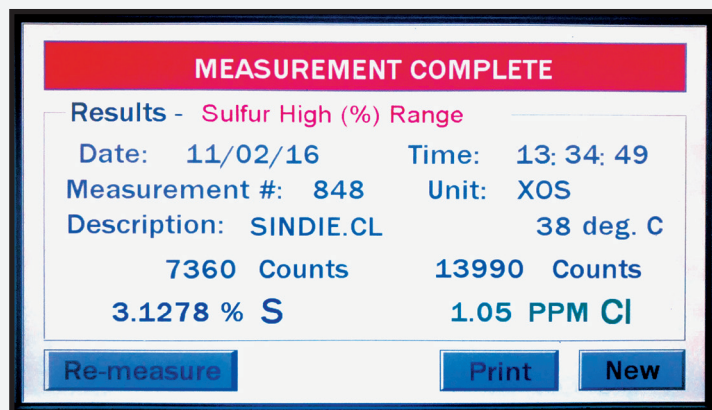
- Sulfur
  - **LOD:** 0.4 mg/kg (ppm) at 300 s, 0.28 mg/kg (ppm) at 600 s\*\*
  - **Dynamic range:** 0.4 mg/kg (ppm) to 5 wt%
- Chlorine
  - **LOD:** 0.3 mg/kg (ppm) at 300 s, 0.21 mg/kg (ppm) at 600 s
  - **Dynamic range:** 0.3 mg/kg (ppm) to 3000 ppm
- Extremely low maintenance: no gasses, heating elements, columns, or quartz tubing
- Automatic sulfur correction
- Easy to use
  - Intuitive touch screen
  - Just plug-in and measure
  - Measurement time: 30-900 s



ASTM D2622, D7039, D7536, D4929,  
ISO 20884 | SH/T 0842

## OPTIONS

- LIMS data output compatible software



## Two Critical Measurements

Sindie +Cl performs trace analysis of both sulfur and chlorine with one push of a button. You can measure both elements in one sample, or measure each separately by simply inserting a new sample.

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# Effective Online Analysis in Petroleum Process Streams

Sindie® Online is an industrial grade process sulfur analyzer with breakthrough detection capability to monitor ultra low sulfur in petroleum or aqueous process streams.\*

## FEATURES AND BENEFITS

- Uses ASTM D7039 technology
- ATEX Zone 1 and NEC Cl | Div 2 Certified
- **LOD:** 0.5 ppmw in hydrocarbon matrices @ 300 s\*\*
- **LOD:** 1.5 ppmw in aqueous streams @ 300 s
- **Dynamic range:** 0.5 ppmw – 3000 ppmw
- For most application purposes, one calibration curve over full dynamic range
- Robust industrial design: wall mounted or stand alone
- Continuous, real-time analysis
- Rapid response to sample change
- Easy to use with intuitive touch screen interface
- Direct measurement in ppm wt
- **Low maintenance:** no consumable liquids, gasses, combustion, or sample conversion
- Not sensitive to sample temperature changes

## OPTIONS

- Multi-stream analysis capability
- Extended Range (XR) available for measurements above 3000 ppmw up to weight percent levels
- Auto-validation capability

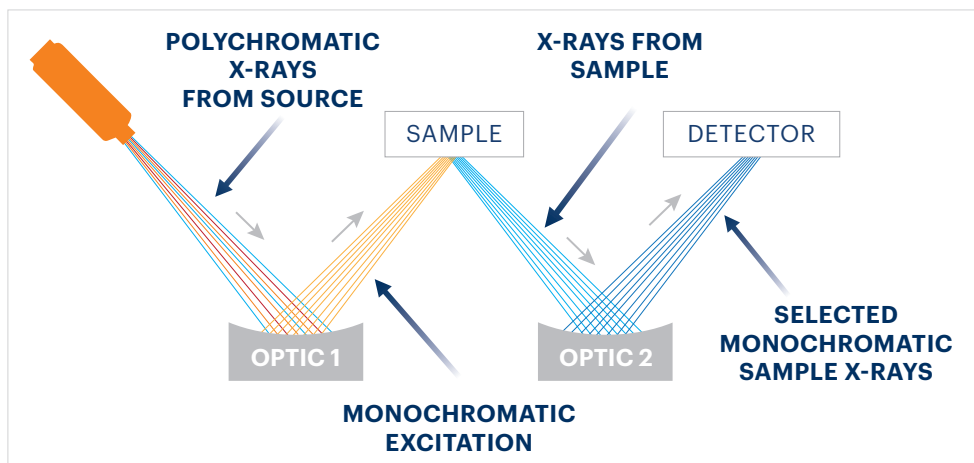


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## Advanced Analysis with MWDXRF

Monochromatic Wavelength Dispersive X-ray Fluorescence (MWDXRF) utilizes state-of-the-art focusing and monochromating optics to increase excitation intensity and dramatically improve signal-to-background ratio compared to traditional WDXRF instruments. This enables significantly improved detection limits, precision, and a reduced sensitivity to matrix effects. A monochromatic and focused primary beam excites the sample and secondary characteristic fluorescence X-rays are emitted from the sample. A second monochromating optic selects the sulfur characteristic X-rays and directs these X-rays to the detector. MWDXRF is a direct measurement technique and does not require consumable gasses or sample conversion delivering robust and low-maintenance analyzers with dramatically lower detection limits and faster response times.



### Autosampler available on Sindie M-Series 2622 and 7039

- 8 sample cell capacity
- Increases productivity
- Utilizes XOS Accucell sample cups

